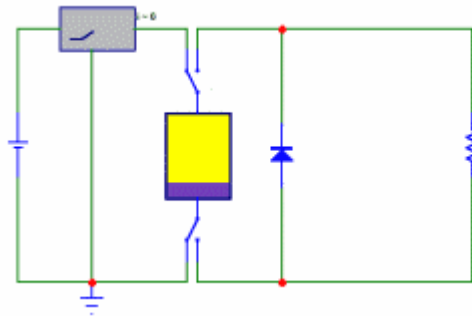


The New Energy

by T.E.B.

Taming the Fierce Energy of the Vacuum



Clean Energy from the Active Vacuum

No electrical engineering department in the Western World presently teaches what powers an electrical circuit, or what actually powers the electrical power grid. None ever has. It also does not appear in a single electrical engineering textbook in the Western world, nor has it ever appeared in one.

All the hydrocarbons ever burned, nuclear fuel rods ever consumed, steam turbines turned, and generators rotated, have not added a single watt directly to the external power line and to the power grid. Nor has any windmill, nuclear power plant, battery, or hydroelectric generator or solar cell array. None ever will.

Every electrical circuit ever built - and those built today - are in fact powered by electrical energy extracted by the circuit dipolarity from the local seething vacuum, from active space itself. But our engineers are trained to build circuits which also self-destroy the extraction of that vacuum energy, faster than they power their loads.

The leaders of our scientific community - including the National Science Foundation (NSF), National Academy of Sciences (NAS), and National Academy of Engineering (NAE) - are unaware of what actually powers an electrical circuit or the electrical power line.

Scientists have not integrated into classical electrodynamics and electrical engineering - or into their own thinking - the broken symmetry of opposite charges - such as of a common dipole or dipolarity - that has been proven in particle physics since 1957.^[1,2,3] Neither have our great national laboratories, etc., integrated this into their official power system thinking.

Instead, on energy matters these institutions, organizations, and leaders continue to inappropriately advise the policy makers of the U.S. Government. The government then inappropriately spends the taxpayers' money in the field of energy research, based on that advice.

Consequently, billions of U.S. research dollars are spent annually on an electrical energy science that is archaic and flawed. More billions are spent on energy systems and centralized power grids that are cumbersome,

frightfully expensive, and completely vulnerable to modern terrorist attack and natural disasters. These systems are dinosaurs waiting for the terrorist comet to destroy them.

To "fuel" such power systems, ever more,

- dams
- hydrocarbon-burning power plants
- pipelines
- oil wells
- natural gas wells
- tanker ships
- harbor facilities
- refineries
- nuclear power plants
- and a host of peripheral power systems such as,
 - windmills
 - solar cell arrays
 - and emergency power generators, etc.
- are required.

This great juggernaut also continues to implement a rapacious energy technology which fouls the planet, pollutes the biosphere, and destroys much of it.

The juggernaut kills off species, is responsible for an uncomfortable and increasing number of human deaths each year from the pollution, and contributes directly to global warming by emitting polluting hydrocarbon combustion products.

It places the economy of the United States - so fragilely based on the continued and escalating availability of cheap energy from cheap fuel such as cheap oil and cheap coal - at the mercy of unfriendly states controlling much of the world's supplies. Terrorists are presented with lucrative and strategic soft targets, easily disrupted and destroyed.

The little-recognized basis for such startling technical statements about the powering of electrical circuits has been in particle physics for nearly half a century. It was evidenced by the award of the Nobel Prize to Lee and Yang in 1957 for their prediction of broken symmetry. The implications of this major discovery - which profoundly impacted all of physics - still have not been incorporated into electrical engineering or into *the ancient Maxwell-Heaviside-Lorentz electrodynamics* taught to electrical engineers.

Consequently, the ubiquitous vacuum energy source of all electrical power - for every electrical circuit and electrical power system, small or gigantic - continues to be resoundingly ignored in "energy science and technology," in our universities, and in our leading scientific institutions.

The environmental activists, seeking to save the biosphere, have not yet recognized the real problem: the appalling energy advice provided to everyone (including the environmentalists) by the scientific community.

With the above "strong grabbers" to evoke the reader's curiosity and attention, let us explain why such startling and seemingly insane statements are true, how things got that way, and what can be done about it.

Brief History of the Present Classical

Maxwell-Heaviside-Lorentz Electrodynamics

In the 1860s, James Clerk Maxwell combined electrical fields and magnetic fields into a common model, and launched the present system of classical electrodynamics still being taught today, though in a more limited form.

Maxwell's seminal paper^[4] was published in 1865, in quaternion-like notation. Quaternion algebra captures many more features and functions of a science which it models than do either the vector algebra or tensor algebra commonly used in electrical engineering.

As an example, with the standard tensor or vector analysis one cannot even "see" the most important functions

accomplished by Nikola Tesla in his patented circuits. *Quaternion analysis of Tesla's actual patented circuits* does show these functions ^[6]. Consequently, mainstream electrical scientists who use only standard tensor analysis and confidently assume that they understand Tesla's work are very much mistaken.

In his 1865 paper, Maxwell specifically lists his 20 equations and his 20 unknowns. His work was strongly contested, because few of the three dozen electrical scientists on earth at the time were capable in quaternion mathematics.

Before he died in 1879, Maxwell himself had started rewriting his 1873 book for a second edition, with simpler equations.

In the 1880s, after Maxwell was deceased, Oliver Heaviside - a brilliant but self-taught scientist who never attended university - played a major role in converting (reducing) Maxwell's equations to what today is vector algebra ^[6]. Heaviside detested potentials, and stated that they should be "murdered from the theory."

The reduction work by Heaviside, Gibbs, and Hertz resulted in the modern four vector equations in some four unknowns. These are taught - along with a further truncation by Lorentz - in every university as "*Maxwell's equations*." They are in fact Heaviside's equations, further truncated by Lorentz symmetrical regauging ^[7].

In those early EM days, the potentials were thought to be mathematical figments, and all electromagnetic phenomena were considered to be the result of the force fields. Hence, any manipulation of the potentials that left the net force fields unchanged was thought to result in prescribing identical systems. Today that is known to be untrue - e.g., in quantum mechanics and quantum electrodynamics, as well as higher group symmetry electrodynamics - but leading classical electrodynamicists still perpetuate the myth.

Both Maxwell's original theory and Heaviside's truncation prescribe two major kinds of electromagnetic systems: (i) those which are "in equilibrium" with their active environment, so they cannot receive and use ^[8] EM energy from it, and

(ii) those which are "out of equilibrium" with their active environment, and so can freely receive and use ^[9] EM energy from it.

The first class of thermodynamic systems (in equilibrium) may be compared to a rowboat floating in a still pond. It has no "net force" upon it, so if we wish the boat to go, we ourselves will have to "row" it, continually putting in force and energy to do work on the boat to force it forward.

The second class of thermodynamic systems (in disequilibrium) may be compared to a sailboat on the same pond, with a wind blowing. Here we may have to input a little energy to the rudder to "steer" the boat, but the energy and force for the heavy propulsive power is provided freely by the wind. So our boat now "does more work in moving through the water" than the energy that we ourselves input to steer it can do.

Simply put, we do not have to row the boat, but only arrange the sails and steer it with the rudder. The wind puts in the excess energy and force required to propel the boat, so the conservation of energy law is not violated.

Such a system can even be completely "self-powering," similar to a windmill in the wind or a waterwheel driving a mill for grinding grain. We have to pay to build the windmill or the waterwheel, and to maintain it, but we do not have to input any energy or force to it ourselves once it's up and running and the wind is blowing or the water is flowing.

The same is true for EM systems, because Maxwell's theory is a purely material fluid theory. Hence, in theory, anything a fluid system can do, Maxwellian systems can also do because the equations are the same and prescribe analogous functions.

Before Lorentz regauging, the *Maxwell-Heaviside equations* were difficult to solve analytically. Numerical methods are often required, and this posed a calculation nightmare back in the 1800s, before the advent of automated calculations. Today, using computers, numerical methods can be accommodated much more easily.

To reduce the difficulty in solving the Maxwell-Heaviside equations and largely eliminate the need for laborious numerical methods, simpler "Maxwellian" equations were sought. Lorentz further reduced the Maxwell-Heaviside equations by "symmetrically regauging" them ^[10]. This symmetry constrains the modern gauge freedom principle, whereby the potential (and the potential energy) of an EM system can be freely changed at will.

In those systems covered by the reduced theory, the potential energy can still be changed, but it can only be changed in such a manner that the two new free fields produced are equal and opposite. Hence, the new fields "fight each other to a draw," changing the internal stress of the system but doing no external work (which requires a net nonzero field).

This "equal and opposite" constraint upon change energy potential has the effect of bottling up any excess EM field energy that might be received by the system from its environment into a force-free stress potential. The system can be freely energized by the environment to stress the system, but it cannot use the free stress potential energy to perform any external work.

To perform work, such a system has to have an additional input of energy where a net force field also emerges. In short, the system has to additionally be asymmetrically regauged - which means the energy has to be input by the system operator or experimenter, since the system itself prohibits the environment from furnishing such "energy with a net field."

In effect, Lorentz modified the equations to select only the far simpler "first class" of Maxwellian systems - those in equilibrium with their external active environment, and thus unable to receive and use any "free energy" from it^[11]. This modification made the resulting equations simpler and much easier to solve analytically, but it also inadvertently discarded an entire class of Maxwellian systems: those in disequilibrium with their active environment, able to freely receive excess potential energy and net field energy, and then dissipate that excess energy to perform work in an external load.

To ease mathematical solution of the equations, Lorentz arbitrarily and unwittingly threw away the electrical windmill and sailboat, and retained only the rowboat.

Electrodynamicists and electrical engineers continue dutifully to utilize the Lorentz-regauged subset equations. Consequently, our present electrical power systems - which are designed and built according to the symmetrized equations - will not and cannot receive and use EM energy from the many "electrical winds" that can easily be made electromagnetically^[12].

By definition, our engineers build only the "first class" of Maxwellian systems, and never build a system of the second class. Most no longer even believe that the second class of EM systems exists - because it does not exist in their archaic 137-year-old EM model.

In short, this is the classic case in science where one branch of the scientific community ardently defends an antiquated and imperfect model, even though better models already exist in other scientific branches.

Two Kinds of Systems and Two Kinds of Thermodynamics

There are two major kinds of thermodynamics (the science of how energy is dissipated and converted). First, there is the oldest kind, for systems in equilibrium with their environment. This equilibrium thermodynamics applies only to systems which do not receive and use^[13] excess energy from their environment. In short, it applies to the rowboat, not to the windmill in the wind, the sailboat, the waterwheel, the solar cell, or the heat pump, etc.

For such a system, one must always input more energy to the system than the work we get back out of the system, because some of our input energy is wasted in the system itself (against friction, internal losses, etc.). So its coefficient of performance (work we get out of the system divided by energy we ourselves input) is always less than unity. Or in short, its $COP < 1.0$. In the real world, we can never break even in such a system^[14], because the systems we build do have internal losses and inefficiencies.

Hence, all our conventional EM power systems exhibit $COP < 1.0$, and have done so for more than a century. Lorentz and our present universities see to it that our engineers design and build only those electrical power systems which self-enforce equilibrium conditions, thus obeying the "old" thermodynamics.

The second kind of thermodynamics is for systems not in equilibrium with their active environment. As an example, Ilya Prigogine received a Nobel Prize in 1977 for his contributions to this kind of thermodynamics (i.e. the thermodynamics of systems far from equilibrium with their active environment).

In short, this kind of thermodynamics applies to the windmill, the waterwheel, the sailboat, the solar cell, the heat pump, etc. It also applies to one class of Maxwellian systems, but unfortunately that is precisely the class that Lorentz arbitrarily discarded by his symmetrical regauging.

Because this type of system can freely receive and use excess energy (so that it has a net nonzero field) from the environment, it can output more work than the energy we ourselves input. The excess energy (with appropriate net field) to do the extra work and power the inefficiencies of the system is furnished by the external environment.

The common home heat pump is a beautiful example of a system far from thermodynamic equilibrium with its environment (the outside atmosphere). By extracting heat energy from the surrounding atmosphere and using it to heat the home, the heat pump under nominal conditions has a theoretical maximum COP = 8.22^[15]. To cool the house, the heat pump reverses to extract heat from the interior air and dissipate it to the external atmosphere.

Even with its internal losses, a good home heat pump will produce a CO = 4.0 under reasonable conditions (not too cold outside, etc.). So COP>1.0 systems are well known - except in electrostatics, where Lorentz arbitrarily discarded them, where the electrical engineers and power scientists continue to discard them, and where all our electrical power systems for more than a century have been designed and built in accord with Lorentz's deliberate reduction of the theory!

The "Perpetual Motion Machine" Conundrum:

An Exercise in Very Bad Logic

The erroneous notion that *all EM systems* (rather than just Lorentz-regauged EM systems) are "*restricted by nature*" to $COP < 1.0$ has been ingrained in electrical engineers and electrical scientists for more than a century.

Accordingly, an iron dogma has arisen around the issue. Yet this dogma is refuted by every single charge and dipole in the universe^[16].

Nonetheless, the great majority of electrical engineers and scientists *firmly believe it is physically impossible and against the laws of nature to build an EM system that produces more work output than the energy we ourselves input*^[17]. Proposing such an EM system is considered to be proposing "perpetual motion machines" that create energy out of nothing.

Most scientists consider the proponent of such EM systems a "perpetual motion nut." Yet the very electrostatics they themselves use and teach already implicitly assumes that every charge and dipole freely creates - and continuously pours out in all directions - EM energy to change the energy density of spacetime and create their associated fields and potentials.

In short, by their own "definition" and accusation, every one of them is already a "perpetual motion nut" of the worst kind.

What is true is that it is physically impossible to build a system - electromagnetic or otherwise - that outputs more work (conversion of the form of energy) than all the usable energy that is input to it and made available to it, either by the operator or by the environment, or by both^[18].

As an example, the Bohren experiment^[19] - replicable in any good university physics laboratory - always outputs more EM energy than the experimenter inputs (some 18 times as much). As another example, every charge and every dipole in the universe already outputs EM energy continuously, and we do not have to input any energy at all once either the charge or the dipole is produced and simply left alone.

A System Continuously Extracting Energy from the Vacuum Can be Made for a Dollar

Nature readily provides bountiful sources of unending EM energy, free for the taking and using - anywhere, anytime. They are called "charges" and "dipoles" - and often, source charges and source dipoles.

As an example, simply place an electret or charged capacitor on a permanent magnet so that the electric field of the electret or capacitor and the magnetic field of the magnet are at right angles to each other. That silly thing will sit there and pour out EM energy in all directions, at the speed of light, so long as you just leave it alone and do not destroy it.

One year after you create it, its outpouring of energy will have reached a radius of one light year - out beyond the solar system - in all directions. It will have changed the energy density of that vast volume of surrounding space of one light-year radius. And it is still pouring out energy at the same rate, steadily changing the energy density of still more space.

Even the "conventional" electrodynamicists agree that a flow of EM energy is continuously emitted from that arrangement^[20]. However, they are resoundingly silent on where that steady outpouring of EM energy comes from and how it is input to the charge or dipole.

There is no detectable input of EM energy to the charge or dipole, but there is a detectable and continuous output of energy from it. Seemingly, every charge and dipole is creating energy out of nothing, which of course totally destroys the conservation of energy law if true^[21]. But since classical electrodynamicists have not been able to solve this conundrum, their textbooks have remained very silent on this fundamental problem and its implications. By their resounding silence, classical electrodynamicists implicitly assume that every source charge and source dipole in the universe is a perpetual motion machine, freely and continuously creating energy out of nothing.

Either one rejects the energy conservation law entirely, or one explains the source charge problem. There is no middle position, because the source charge is real and it ubiquitously exists. And it ubiquitously pours out that energy.

So we point the finger right back at the self-appointed critics and ask in their own terminology, "Who are the real perpetual motion nuts here? You cannot logically consider and implicitly accept every charge and dipole as a perpetual motion machine, freely creating energy out of nothing at all, and then protest that there can be no such thing as a COP>1.0 EM system!"

All the EM energy in any EM circuit or device comes from those same source charges and source dipoles. If one cannot explain where and how those charges obtain the energy to keep pouring it out, then one knows absolutely nothing about what truly powers every electrical circuit.

Since the energy being received is non-observable, it must be received in some peculiar and normally unusable form. The charges must then transduce the received energy into usable and observable form and re-emit it in that new form, so that the circuit can catch some of it and be "energized."

The source charge problem focuses one's attention on the real problem. Either we must discard energy conservation altogether, or admit that every charge and dipole is already a COP>1.0 Maxwellian EM system, freely changing the form of some unusual received energy. It is continuously doing "free" work, since work is the changing of form of energy and every charge and dipole is freely receiving virtual EM energy and changing its form to observable EM energy. Continuously!.

The quandary of the source charge and its continuous outpouring of real EM energy has been called "the most difficult problem in classical and quantum mechanics"^[22]. Until 2000 there did not appear any classical solution to that long-vexing problem of the association of the fields and potentials - and their energy - reaching across all space, with the source charge that produces them.

But the basis for the solution has been present in particle physics ever since the discovery of broken symmetry in 1957.

In 2000, the present author proposed a formal solution^[23] consistent with quantum field theory^[24], particle physics^[25], quantum electrodynamics^[26], and re-interpretation^[12] of Whittaker's biwave decomposition of the scalar potential^[27].

We used the term "giant negentropy" since the charge and dipole continuously absorb, cohere, organize, and

re-emit energy from the vacuum.

Since every charge in every circuit is already continuously negentropic, then our building of entropic circuits using these negentropic charges must involve some characteristic of circuit design where we kill the negentropy. We will explain that aspect shortly.

Our universities should - but do not - focus on the main problem:

How does one then intercept, divert, and collect some of that freely flowing EM energy so easily evoked by every charge and dipolarity, and use it to freely power loads, without disarranging and destroying the actual "power source"?

No university seems to be working on that problem, nor is the Department of Energy, nor are any of the great national laboratories. Nor are any of the great scientific associations.

Yet that single problem is the only fundamental electrical power problem. All the rest of the "recognized power problems" are just so much psychological displacement activity so as not to have to disturb the comfortable Lorentz-regauged and crippled classical electrodynamics.

There is no problem at all in obtaining great rivers and gushers of EM energy from the ubiquitous vacuum - cheaply, easily, and enduringly. Every charge and every dipole already does that. There is no problem in "producing the free electromagnetic energy winds" needed to power even the greatest loads, at any place in the universe, and at any time.

Instead, the only problem is in building a proper "electrical windmill" to divert, collect, and use some energy from such a steady electrical wind, without destroying the broken symmetry source of the wind (the source dipole), and using (dissipating) that collected energy to power our desired load.

All our present closed-current loop circuits are designed ^[28] to use half their freely collected energy to destroy the source dipole (in the generator or battery). The other half of their collected energy is used to power the external circuit's losses and loads.

So more of the freely collected EM energy is used to destroy the "wind" source, than is used to power the load! We then have to continually input at least as much energy to restore the source (the dipole), as was used to destroy it.

So we continually have to input more energy to restore the dipole - that the engineers unwittingly design and build the circuits to deliberately destroy - than the circuit provides to power the loads.

All our engineers design and build electrical power systems that destroy their free electrical wind sources faster than they power their loads. Such inane power systems obviously provide $COP < 1.0$, because of the deliberate circuit design used by the engineers.

It is akin to building a magnificent but flawed sailboat, which - once it starts to move in the wind - rapidly and continually lowers its own sails faster than the wind can propel the boat. To keep the boat going, one thus has to continually pay to keep raising the sails that the boat itself keeps lowering.

Our electrical engineers and electrical power scientists are busily engaged in perpetuating an analogous electrical power, and our scientific community is busily assuring us that they are practicing "advanced electrical science."

We pay the power company to engage in a giant sumo wrestling match inside its generators, and to deliberately lose.

The Modern Vacuum: Empty Space Has Unlimited EM Energy

"Vacuum" is what we usually think of as the empty space left after all the air is removed. However, in modern physics it is well known that space is not such an "emptiness" at all. Instead, it is filled with energetic particles that appear and disappear with extraordinary speed. Hence, "the vacuum" in physics is more like a seething cauldron, boiling fiercely ^[29]. The energy density of this boiling is so great that it literally boggles one's mind ^[30].

A bit of "empty space" the size of a sugar cube contains enough "seething electromagnetic energy" to power all the electrical loads on earth for millions of years. Obviously, if we can extract just a tiny fraction of this energy in electromagnetic form we can use it to power our loads for free - or nearly so. We need only power the "gating" or "switching" of the flowing energy, and thus cause a great deal of work to be performed, even though we ourselves input little or no energy.

Can the EM Energy of the Vacuum Be "Tapped" and Extracted for our Use?

It's widely believed that it is impractical to try to extract very much usable energy from the seething, highly energetic vacuum. Oh yes, everyone agrees that the tiny little Lamb shift^[31] of the orbit of one electron in a certain atom is due to vacuum energy interaction.

Well, it may seem tiny, but although the Lamb shift is a very small effect of a single electron in a single atom, the energy density of that interaction is greater than the surface energy density of the sun!^[32]

And, oh yes, everyone agrees that the Casimir effect^[33] - a vacuum-induced attraction of two conducting plates when separated but close - also is due to vacuum energy interaction. But of course they believe that it, too, is a very small effect, and not worth practical consideration.^[34]

Then the assertion is often made - particularly by electrical power engineers, who normally are not well acquainted with modern physics - that thermodynamics prohibits extracting and using vacuum energy. That is quite untrue, as we have explained, and as Cole and Puthoff have rigorously demonstrated.^[35] Thermodynamics does not explain how to do it practically, but it does permit it technically.

The principle of superposition of charge and the field effects of charges, ubiquitously assumed and verified in countless classical experiments, also tells us a magnificent thing: The source charge production of its associated fields and potentials is self-coherent. This means that within reason, doubling or tripling the amount of energy-collecting and transducing charged particles (source charges) at a given point will give double or triple, and so on, the resulting potentials and fields (gathered EM energy and local EM energy winds) produced by that source charge collection.

So the proven broken symmetry of opposite charge collections - such as on the ends of a dipole or dipolarity - need not be a small effect at all! We can use as many unit charges as we wish in each one of those "separated opposite charges" in a dipole, so long as we hold the charges apart with a proper restraining dielectric.

In a normal electrical circuit (as between the terminals of a generator or battery), we can have many positive and negative charges involved, so that the EM energy extracted from the vacuum can be very powerful. In other words, the dipole can readily be made essentially as powerful as we need for our usual specific purposes. We can easily produce a megawatt or even 1,000 megawatts of energy flow per second by making a bigger dipole consisting of more separated charges.

All we have to do is pay to make the dipole once, then leave it alone and not allow it to be destroyed by the inane way that engineers normally build their circuits and power their loads.

The latter problem - the only real problem preventing the engineers from easily producing all the cheap, clean electrical power they wish, without burning fuel, consuming fuel rods, building pipelines, or building dams - arises because this technology is not being furiously funded and worked on as a national Manhattan Project.

Indeed, the very notion continues to be castigated and ridiculed. And that is perhaps the greatest scientific travesty of our times. It simply reveals the "soft underbelly" of our present energy science, which does not even include what powers its circuits.

Can an Electrical Power System Output More Energy than We Input to It?

Hopefully, by now the reader will exclaim,

"Of course! Just pay to make a source dipole. Prepare a suitable interception and collection external circuit which will dissipate its collected energy in a load, without destroying the source dipole faster than it powers the load."

That's all there is to it.

The only remaining problem is in that single phrase, "*without destroying the source dipole faster than it powers the load.*"

Since that is the problem, and the only problem, preventing a total solution to the energy crisis forever, every university, every power company, the NSF, the NAS, the Department of Energy, and every major research lab should be working on it. But of course none of them is working on it, interested in it, or funding it.

The problem calls for "*out-of-the-box thinking*," to use the prevailing buzzword phrase presently in vogue.

Simply consider a charged capacitor or a permanent magnet. That beast is freely extracting and pouring out real EM energy, from the active vacuum, continuously. So how do we intercept some of the energy flow, convert the intercepted energy to, say, oscillating EM energy, and then use that energy to power a load - all without destroying the magnet or killing the charge in the capacitor?

This is the problem, and work on it by our sharp young graduate students and post-docs is something for which the National Science Foundation and the National Academy of Sciences should provide funding and which they should accord the highest priority.

That these and other agencies have not even recognized the primary electrical energy problem yet is a sad commentary on our present scientific acumen.

Why Don't Present EM Systems Power Themselves?

By now the reader hopefully will be able to see that our systems don't power themselves because our engineers specifically design them so they cannot do it. The scientists and engineers themselves are the greatest foes to cheap, clean electrical energy, a clean biosphere, and a decentralized power system using no fuel.

The closed current loop circuit for power systems is regarded like something that Moses must have brought down from the mountain with him, carved on those stone tablets.

It isn't.

To quote Nikola Tesla, who made practical generators and motors possible with his discovery of the rotating magnetic field:

"Today's scientists have substituted mathematics for experiments, and they wander off through equation after equation and eventually build a structure which has no relation to reality."

Understand, a good model is essential to technology. But if the model is inadequate, then it should either be corrected or a new model should be substituted that is adequate.

But our electrical power engineers and most of the scientific community have developed a mindset where

- the closed current loop circuit,
- Lorentz symmetrical re-gauging, and
- COP<1.0 electrical circuits...
- ...are considered as iron laws of nature.

They are not such at all, but merely the self-limited and self-enforced contrivances of human beings.

And we should always remember one succinct statement by Evans ^[36]:

"No theory can falsify a successful and repeatable experiment, but a single successful and repeatable experiment can falsify any theory."

We borrow a quote from Tesla on another subject ^[37] and hope that it comes true for the present dogma that only COP<1.0 electrical power systems are possible:

"... in a short time it will be recognized as one of the most remarkable and inexplicable aberrations of the scientific mind which has ever been recorded in history."

What Is Significant About More Modern Kinds of Electrodynamics?

The present Lorentz-regauged Maxwell-Heaviside theory effectively assumes an inert vacuum - falsified for half a century by quantum mechanics and particle physics - and no curvatures of local spacetime - falsified for nearly a century by general relativity.

Since the active vacuum and the local curvature of spacetime - and their dynamics - are the "active external environment" for an electrical power system, then present power engineers and classical electrodynamicists assume away any and all net interactions of the system with its external active environment. That is how the COP>1.0 Maxwellian systems are arbitrarily discarded, and only electrical power systems that self-enforce COP<1.0 are designed, built, and permitted.

To then drum into the students' heads that this travesty represents a "law of nature" is ludicrous. It has become disinformation, propaganda, and dogma, and it is against the very spirit of scientific inquiry and scientific reasoning.

The proper scientific frame of mind is skepticism tempered by open-mindedness. If one is skeptical and dogmatic, one is not scientific, regardless of one's pedigree. If one is open-minded and not skeptical, one is scientifically naive.

Meanwhile, much more modern systems of electrodynamics have been developed in particle physics and elsewhere. In modern theory, the models are based very powerfully on the theory of groups. Groups have symmetries, designated by such expressions as U(1), SU(2), O(3), etc.

The higher the group symmetry utilized by an algebra, the greater range of physical phenomena the algebra can be applied to and can model.

A particularly good higher group symmetry electrodynamics, in this author's opinion, is the O(3) electrodynamics founded by Evans and Vigier and further expounded by Evans.^[38] Evans has shown that O(3) electrodynamics is a part of the Sachs unified field theory electrodynamics.^[39]

Thus, O(3) electrodynamics can be used not only for "normal" electrodynamic modeling but also for "exotic" unified field theory modeling. Further, it can be used for engineering, so it permits the development of a drastically extended electromagnetic technology which can eventually engineer many new things,^[40] including antigravitational effects.^[41]

At least one highly successful antigravity experiment was performed by Sweet, in an experiment designed by the present author.^[42] The weight of an object was steadily reduced by 90%, on the laboratory bench.

Footnotes and references:

1. Lee and Yang strongly predicted broken symmetry in 1956; see T. D. Lee, "Question of Parity Conservation in Weak Interactions," *Physical Review*, 104(1), Oct. 1, 1956, p. 254-259; - and C. N. Yang, "Remarks on Possible Noninvariance under Time Reversal and Charge Conjugation," *Physical Review*, 106(2), 1957, p. 340-345.
2. Wu et al. experimentally proved broken symmetry in 1957; see C. S. Wu, E. Ambler, R. W. Hayward, D. D. Hoppes and R. P. Hudson, "Experimental Test of Parity Conservation in Beta Decay," *Physical Review*, Vol. 105, 1957, p. 1413.
3. So revolutionary to physics was this discovery of broken symmetry, that the Nobel Prize was awarded to Lee and Yang in the very same year that Wu experimentally proved it. For Lee's Nobel acceptance speech, see T. D. Lee, "Weak Interactions and Nonconservation of Parity," Nobel Lecture, Dec. 11, 1957. In T. D. Lee, *Selected Papers*, Gerald Feinberg, Ed., Birkhauser, Boston, 1986, Vol. 1, p. 32-44.

4. James Clerk Maxwell, "A Dynamical Theory of the Electromagnetic Field," Royal Society Transactions, Vol. CLV, 1865, p 459.
5. See Terence W. Barrett, "Tesla's Nonlinear Oscillator-Shuttle-Circuit (OSC) Theory," Annales de la Fondation Louis de Broglie, 16(1), 1991, p. 23-41. Tesla was able to shuttle the potential (and the energy) around in his circuits at will. Barrett, one of the pioneers of ultrawideband radar, extended Tesla's method and obtained two U.S. patents for use in signaling science: See T. W. Barrett, "Active Signalling Systems," U.S. Patent No. 5,486,833, issued Jan. 23, 1996; - "Oscillator-Shuttle-Circuit (OSC) Networks for Conditioning Energy in Higher-Order Symmetry Algebraic Topological Forms and RF Phase Conjugation," U.S. Patent No. 5,493,691, issued Feb. 20, 1996.
6. As stated, when Maxwell died, he himself was engaged in converting his own quaternion-like theory into the much simpler vector theory. See Maxwell, James Clerk, A Treatise on Electricity and Magnetism, Oxford University Press, Oxford, 1873, Second Edition 1881 (Maxwell was already dead), Third Edition, Volumes 1 and 2, 1891. Foreword to the second edition was by Niven, who finished the work as Maxwell had dramatically rewritten the first nine chapters, much new matter added and the former contents rearranged and simplified. Maxwell died before finishing the rest of the second edition. The rest of the second edition is therefore largely a reprint from the first edition. The third edition edited by J. J. Thomson was published in 1892, by Oxford University Press, and later was published unabridged by Dover Publications, New York, 1954. J. J. Thomson finished the publication of the third edition, and wrote a "Supplementary Volume" with his notes. A summary of Maxwell's modified equations are given in Vol. II, Chapter IX of the third edition. However, Maxwell had gone (in his second edition) to some pains to reduce the quaternion expressions himself, and therefore to not require the students to know the more difficult calculus of quaternions (so stated on p. 257).
7. Actually the first "symmetrizing" truncation of Maxwell's equations was by Ludwig van Lorenz, shortly after Maxwell's 1865 definitive paper was published. See Ludvig Valentin Lorenz, "On the identity of the vibrations of light with electrical currents," Philosophical Magazine, Vol. 34, 1867, p. 287-301. In this paper L. V. Lorenz gave essentially what today is called the Lorentz symmetrical regauging. However, when H.A. Lorentz, then perhaps the greatest electrical scientist, regauged the Maxwell-Heaviside equations in the 1880s, the H. A. Lorentz regauging was adopted because of Lorentz's prestige.
8. The symmetrized systems can and do receive the excess energy only in the form of a net force-free stress potential (simply examine the regauging equations and the regauging condition). With no net force available to dissipate the stress potential energy, no net work can be done by the excess stress energy received. That is precisely what the Lorentz condition means, in simpler terms. The closed current loop circuit automatically self-applies Lorentz regauging, by making the back-emf precisely equal to the forward emf, so that the collected energy becomes stress energy with no net force fields self-generated by the system itself. In that case, the operator must continue to input some form of net work and net force field, for which the system will respond by using it to produce the back emf. In that "using it," the system is able to power a load to that extent and that extent only. The known absence of Newton's third law from electrodynamic fields already assures us that back-emf equal to forward emf is not a law of nature in electrodynamics. Yet mainstream electrical engineering persists in assuming that it is.
9. Disequilibrium systems produce net force fields along with receipt of the excess energy - something we have called "asymmetrical regauging." This violates the Lorentz condition, and the system can then utilize this net force to dissipate the net energy received, thus performing some "free work." This is no more mysterious than a windmill receiving energy and net force from the environment, and using that force to dissipate the energy and do free work. To imply that it is somehow a violation of natural law or a violation of energy conservation is simply ridiculous.
10. To see how this is done, see J. D. Jackson, Classical Electrodynamics, Second Edition, Wiley, New York, 1975, p. 219-221; 811-812.
11. Again, a system in equilibrium can and does receive excess energy from the environment, but it also immediately returns the energy. The "force in" and "force out" balance to a net zero, so input of additional energy just results in the production of excess system stress, but no free work in an external load.

12. Any dipole (such as a permanent magnet) or charge pours out EM energy in all directions at the speed of light - and hence produces a continuous "free electromagnetic wind." If we leave it intact, the dipole or the charge will pour out such energy indefinitely. The dipoles and charges in the original matter of the universe have been doing it for some 15 billion years, and they are still doing it. So the process does not "run down." Every charge and dipole in the universe exhibits giant negentropy, producing all that EM energy and the EM fields and potentials in nature. Yet for more than a century we have designed and built only entropic systems. We have steadily despoiled the biosphere in the process.
13. We stress this point most strongly. Such a system may freely receive excess energy from its environment, but it self-enforces equilibrium by applying some form of Newton's third law, to negate any net force fields resulting from the excess energy. Consequently, this system can change its stress energy, but not its usable net field energy to do external work. It can only change the equilibrium condition, with a change of stress potential as it changes the conditions of equilibrium.
14. Superconductive sections in a system are often touted as COP = 1.0 systems, by implication. However, when the cryogenics overhead we must pay is counted, they are grossly underunity.
15. David Halliday and Robert Resnick, *Fundamentals of Physics, Third Edition Extended*, Wiley, New York, 1988, Vol. 1, p. 518.
16. E.g., see M.W. Evans, P.K. Anastasovski, T. E. Bearden et al., "Explanation of the Motionless Electromagnetic Generator with O(3) Electrodynamics," *Foundations of Physics Letters*, 14(1), Feb. 2001, p. 87-94; - "Explanation of the Motionless Electromagnetic Generator by Sachs's Theory of Electrodynamics," *Foundations of Physics Letters*, 14(4), 2001, p. 387-393.. The tired old "perpetual motion nonsense" charge was strongly raised in the vigorous refereeing of these two AIAS papers. To refute the charge raised against the latter paper, I prepared a vigorous rebuttal, "On Permissible COP>1.0 Maxwellian Systems: A Reply to the Board Member," and submitted it to the referees and editors. Based on the paper, the referees and editors overruled the objections and published the second paper because every charge and every dipole in the universe already clearly demonstrates a COP>1.0 Maxwellian system. We challenged the classical scientists to provide a solution to the source charge problem in their Lorentz-regauged theory, then showed the solution which can only appear in a higher symmetry electrodynamics - such as the O(3) EM or the Sachs EM used in the two papers. The old EM assumes an inert local vacuum and a locally flat spacetime, both assumptions being long since refuted in modern physics. And every charge and dipole demonstrates the falsity of those two assumptions, as is easily demonstrated on the lab bench.
17. Except the classical electrodynamicists who have not resolved their own source charge problem, no one advocates that an EM system can do more work in a load than the total amount of usable energy that is input to it! Instead, one advocates that it can do more work than the operator inputs; the remaining energy is freely input from the active external environment due to the disequilibrium (the broken symmetry) condition. The broken symmetry also specifically implies violation of the Lorentz symmetry condition, a priori.
18. The reason is extraordinarily simple, once one makes clear definitions of terms. Work rigorously is a change the form of energy. A priori, an inert system cannot "convert the form of energy" it has not received and collected. But it can receive additional energy from the environment and convert more than the operator himself inputs, in which case the environment freely inputs the remainder of the input energy being converted in form!
19. Craig F. Bohren, "How can a particle absorb more than the light incident on it?" *American Journal of Physics*, 51(4), Apr. 1983, p. 323-327. Under nonlinear conditions, a particle can absorb more energy than is in the light incident on it. Metallic particles at ultraviolet frequencies are one class of such particles and insulating particles at infrared frequencies are another. See also H. Paul and R. Fischer, {Comment on "How can a particle absorb more than the light incident on it?}," *Am. J. Phys.*, 51(4), Apr. 1983, p. 327. The Bohren experiment is repeatable and produces COP = 18.
20. As an example, quoting Jed Z. Buchwald, *From Maxwell to Microphysics*, University of Chicago Press, Chicago and London, 1985, p. 44: "[Poynting's result] implies that a charged capacitor in a constant magnetic field which is not parallel to the electric field is the seat of energy flows even though all

macroscopic phenomena are static."

21. The key is in that word "detectable" - or as the physicist would say, "observable." The experiment rigorously demonstrates that, if the law of energy conservation is valid, then the charge and the dipole must be continuously receiving energy (from its external environment) in nonobservable (virtual) form and integrating it into observable form. And so it is, as has been known in particle physics for 45 years. In the case of the dipole, it is due to the known broken symmetry of the opposite charges comprising the dipole. In the case of the charge, when one accounts the clustering virtual charges (from quantum electrodynamics), then the charge is actually a set of composite dipoles, each exhibiting the required broken symmetry. Hence, charges and dipoles freely absorb (receive) virtual photon energy from the seething vacuum (particle physics proves this), integrating the absorbed "disintegrated" energy into observable form, and re-emitting real, observable EM energy in all directions, continuously. That this has not yet appeared in the electrical engineering model is strictly the fault of the leaders of the scientific community who have not enforced its inclusion. Consequently, the electrical engineers do not even understand what powers an EM circuit or system. It is energy from the vacuum, extracted and integrated by the source charge and the source dipole.
22. E.g., see D. K. Sen, *Fields and/or Particles*, Academic Press, London and New York, 1968, p. viii.
23. T. E. Bearden, "Giant Negentropy from the Common Dipole," *Proceedings of Congress 2000*, St. Petersburg, Russia, Vol. 1, July 2000, p. 86-98. Also published in *Journal of New Energy*, 5(1), Summer 2000, p. 11-23. Also carried on DoE restricted website and cheniere.org.
24. F. Mandl and G. Shaw, *Quantum Field Theory*, Wiley, 1984, Chapter 5.
25. With the broken symmetry of unlike charges and with the Nobel Prize awarded to Lee and Yang in 1957.
26. With the fact that virtual charges of opposite charges cluster around an "isolated" observable charge. One differential piece of the observable charge and one clustering virtual charge of opposite sign comprise a composite dipole. The "isolated source charge" may thus be treated as a set of composite dipoles. The broken symmetry of opposite charges solves the problem for any dipole, and thus for the "isolated" charge as a set of composite dipoles.
27. E. T. Whittaker, "On the Partial Differential Equations of Mathematical Physics," *Mathematische Annalen*, Vol. 57, 1903, p. 333-355.
28. By use of the conventional closed current loop circuit, where all the current in the external circuit (through the losses and the loads) is returned by a "ground return line" back through the source dipole that is freely extracting the EM energy from the vacuum and radiating it. This "spent" current must be forcibly rammed back up through the source dipole itself, scattering the charges and destroying the dipole. We must then input additional energy to the shaft of the generator, to rotate it and restore that dipole.
29. For a good description of the modern vacuum, see I. J. R. Aitchison, "Nothing's plenty: The vacuum in modern quantum field theory," *Contemporary Physics*, 26(4), 1985, p. 333-391.
30. E.g., see R. Podolny, *Something Called Nothing: Physical Vacuum: What Is It?*, Mir Publishers, Moscow, 1986, p. 181. In mass units, the energy density of the virtual particle flux of vacuum is on the order of 1080 grams per cubic centimeter.
31. Willis E. Lamb Jr. and Robert C. Retherford, "Fine structure of the hydrogen atom by a microwave method," *Physical Review*, 72(3), Aug. 1, 1947, p. 241-243. Lamb received the 1955 Nobel Prize in physics jointly with Polykarp Kusch for experiments measuring the small displacement later called the "Lamb shift" of $0^{+}n_e$ of the energy levels in atomic hydrogen.
32. E.g., see W. T. Grandy Jr., "The Explicit Nonlinearity of Quantum Electrodynamics." in *The Electron: New Theory and Experiment*, David Hestenes and Antonio Weingartshofer, Eds., Kluwer Academic Publishers, Boston, 1991, p. 149-164. Quoting, p. 150: ". . . the energy density associated with the Lamb shift would produce a Poynting vector about three times the total power output of the sun, and a gravitational field disrupting the entire solar system!" We comment that the reaction is ongoing in a

maelstrom of additional such violent interactions, and so - even though each of these fierce interactions might be energetic enough to disrupt the entire solar system - the net summation is a very tame little thing confined to shifting that single little electron, while still participating in the fluctuations of the vacuum energy elsewhere. The summation of infinite things to leave a manageable finite thing, is well known and used in particle physics, where it is often referred to as renormalization.

33. H. B. G. Casimir, "On the attraction between two perfectly conducting plates," presented at a meeting of the Royal Netherlands Academy of Arts and Sciences on 29 May, 1948. Published in the same year in *Proceeding Koninklijke Nederlandse Akademie van Wetenschappen*, Amsterdam, Vol. 51(7), 1948, p. 793-796.
34. A very accurate modern measurement of the Casimir effect is given by S. K. Lamoreaux, "Demonstration of the Casimir Force in the 0.6 to 6mm range," *Physical Review Letters*, 78(1), Jan. 6, 1997, p. 5-8.
35. Daniel C. Cole and Harold E. Puthoff, "Extracting Energy and Heat from the Vacuum," *Physical Review E*, 48(2), Aug. 1993, p. 1562-1565.
36. Myron W. Evans, private correspondence.
37. Nikola Tesla, "The True Wireless," *Electrical Experimenter*, May 1919. Heaviside was speaking of Hertzian (transverse) EM waves in the vacuum. Indeed, with Whittaker's bidirectional longitudinal EM wave decomposition of the scalar potential, and by quantum field theory's finding that the time-polarized photon and longitudinal photon, when combined, are observed as the instantaneous scalar potential, one can make a very good case that the EM waves in space are longitudinal EM waves anyway. This is particularly interesting since nearly a dozen nations have already secretly weaponized longitudinal EM wave technology.
38. Particularly see M. W. Evans, "O(3) Electrodynamics," in *Modern Nonlinear Optics*, Second Edition, 3 vols., Edited by M.W. Evans, Wylie, New York, 2001, Part 2, p. 79-267. Evans also has more than 600 other papers in the scientific literature.
39. M. W. Evans, "The Link Between the Sachs and O(3) Theories of Electrodynamics," in M. W. Evans (Ed.), *Modern Nonlinear Optics*, Second Edition, , 3 vols. Wiley, 2001; vol. 2, p. 469-494; M.W. Evans et al., "Derivation of O(3) Electrodynamics from the Irreducible Representations of the Einstein Group," *Foundations of Physics Letters*, 2002 (in press).
40. E.g., M. W. Evans et al., "Explanation of the Motionless Electromagnetic Generator with O(3) Electrodynamics," *Foundations of Physics Letters*, 14(1), Feb. 2001, p. 87-94; - "Explanation of the Motionless Electromagnetic Generator by Sachs's Theory of Electrodynamics," *Foundations of Physics Letters*, 14(4), Aug. 2001, p. 387-393.
41. M. W. Evans et al., "Anti-Gravity Effects in the Sachs Theory of Electrodynamics," *Foundations of Physics Letters*, 2002 (in press).
42. Floyd Sweet and T. E. Bearden, "Utilizing Scalar Electromagnetics to Tap Vacuum Energy," *Proceedings of the 26th Intersociety Energy Conversion Engineering Conference (IECEC '91)*, Boston, Massachusetts, 1991, p. 370-375. Sweet's device produced 500 watts for a 33 microwatt input. A highly successful anti-gravity experiment was also performed, and is reported in the paper. Unfortunately Sweet later died and never fully revealed the activation secret by which barium ferrite magnetic materials could be in strong self-oscillation at 60 Hertz. Weak self-oscillation of such permanent magnetic materials at higher frequency is known, of course. E.g., see V. S. L'vov, *Wave Turbulence Under Parametric Excitation: Applications to Magnets*, Springer Series in Nonlinear Dynamics, Springer-Verlag, New York, 1994.

Historical Background of... Scalar EM Weapons



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[This was a paper hastily whipped together, some years ago, to be able to send an abbreviated background paper to correspondents. The history prior to this paper runs from *Hamilton and his quaternions* to *Maxwell and his quaternions* theory, to *Heaviside's vector curtailment of Maxwell's theory*, to Nikola Tesla, to Whittaker, to Einstein and relativity, to Kaluza and Klein, and to the beginning of quantum mechanics.]

We begin our history in 1939 at T.H. Moray's lab in Salt Lake City. In that year, a Russian agent obtained detailed drawings of Moray's specialized amplifier which extracted energy from the powerful quantum mechanical fluctuations of vacuum. Moray's radiant energy device weighed 55 pounds and produced 50 kilowatts of power without conventional input. Numerous demonstrations are documented by engineers, scientists, and community leaders. After extensively testing Moray's device and obtaining the drawings by subterfuge, the Soviet agent destroyed the device. Moray, a truly great pioneer who was unjustifiably ignored in his time, had expended several hundred thousand dollars and exhausted his funds on the first unit. He was never financially able to rebuild it.

Thus in 1939 the Soviets obtained the secret, detailed drawings for a 29-stage electromagnetic device far ahead of its time. Moray had made the first germanium transistor, an amorphous pellet of multiple, finely powdered ingredients, sintered under heat and pressure to lock-in stress, and containing minute interfaces (very tiny built-in cracks) which acted as tiny scalar EM interferometers. Over the years Moray had painstakingly constructed 29 special tubes, each comprised of a blown quartz envelope containing several (usually three) of his transistor pellets. Only one in 300 of Moray's tubes would work, and thousands had been built to obtain the 29 good ones used in Moray's radiant energy amplifier. Each of Moray's pellets in the tube produced a vacuum state far from thermodynamic equilibrium, and the tri-assembly functioned as a macroscopic scalar interferometer and collector. Moray's 55-pound amplifier curved local spacetime and produced 50 kilowatts of usable load power from the curved vacuum source itself. Additional power could be taken from intermediate stages as well.



In short, Moray had produced a "*Prigogine*" transistor, still slightly more advanced than the transistors of today. [Ilya Prigogine - below right image - received the Nobel Prize a few years ago for developing a new thermodynamics of systems far from thermodynamic equilibrium. Negative entropy is possible in such a system.]. Greatly stimulated by Nikola Tesla's repeated pronouncement that the ether was a sea of energy, Moray had painstakingly developed his special transistors, and arranged an assemblage of them to form a scalar interferometer and collector of the disintegrated "energy" (virtual particle flux) of vacuum, integrating it into real observable energy fed to a load. Some day Moray, together with Tesla, will be recognized as the first great scientific geniuses who succeeded in engineering scalar electromagnetics, electrogravitation, local general relativity, and Prigogine's new thermodynamics.

So in 1939 detailed drawings of Moray's unit were obtained and forwarded to Russia, along with details of experiments that the Soviet agent performed with the device in Moray's laboratory. Moray's lab still stands in Salt Lake City, Utah, operated by his son, John Moray, who has faithfully carried on his father's work.

However, in 1939 World War II was looming ominously on the horizon. Japan had started her expansive march in the Far East in 1931. In Germany, the Nazi Party and Adolf Hitler had risen to power in 1933. Italy had moved against Ethiopia in 1935-1936. From 1936 to 1939, Italy, Germany, and the Soviet Union were unofficially involved in the Spanish Civil War, testing weapons for a wider new conflict in the future. The Sino-Japanese War in China (1937-1942) was proceeding. Germany had seized Austria and most of Czechoslovakia to the dismay of the West.

On September 1, 1939, Germany invaded Poland, and two days later Great Britain and France declared war. British and allied troops were forced off the continent, however, and miraculously evacuated at Dunkirk in May-June 1940. In June 1940 Italy, under Mussolini, entered the war and France surrendered shortly thereafter. In the latter half of 1940 a valiant Britain held firm against an onslaught of German bombers, and the restless Nazi juggernaut began to face toward Russia.

Thus in the cataclysmic events of 1939-1940, a Russia looking full in the face of a Nazi threat and raging war in Europe had little time or inclination available to pursue the bizarre, puzzling drawings and notes obtained from Moray's lab. The pace of events in Europe continued inexorably, occupying all the energy and attention of the Soviet Union. In attempting to sidestep attack by Hitler, Russia had signed a Nonaggression Pact with Germany in August 1939. Consolidating her position, Russia had engaged in a stubborn, bloody war with valiant little Finland from November 1939 to March 1940, suffering heavy casualties and leading Hitler to conclude that Russia was militarily weak. In April 1940 Germany had occupied Norway and Denmark, and in May-June 1940 German armies had disastrously routed the British and French at Dunkirk. As 1940 wore on, Hitler had moved into Romania, Bulgaria, Yugoslavia, and Greece. A beleaguered Russia signed the Soviet-Japanese Neutrality Pact of April 13, 1941 so that Japan would not pin Germany in striking the Soviet Union. By early spring of 1941, German attack on Russian forces was imminent, with daily overflights of Russian lines and probing incidents.

On June 22, German divisions attacked in a mighty blitzkrieg, encountering little resistance, and the war between Russia and Germany had begun in earnest. As war raged on the Eastern Front and in Europe, on December 7, Japan attacked Pearl Harbor, and the United States entered the war against Japan and Germany.

The history of World War II is well-known and need not be repeated here.

However, during the war the U.S. developed the atomic bomb in a feverish and highly secret technical effort. During the Potsdam conference, the U.S. exploded its first atomic bomb in the New Mexico desert. At the conference, Stalin was informed of the bomb and its first successful test by Truman, who had replaced the deceased Roosevelt as U.S. President. An impassive Stalin showed no apparent concern, but inwardly he knew that his secret plan to conquer Europe a year or two after the war—by which time the West would have beaten its swords back into plowshares—now had to be abandoned. A short time after, the U.S. dropped two bombs on Japan by stunning surprise. Faced with total and certain annihilation, the heretofore fanatical Japanese capitulated.

As one aftermath of the U.S. development and use of the atomic bomb, Stalin—ever the total dictator—lashed his Soviet Academy of Sciences furiously. Undoubtedly he pointed out that the destiny of Communism had been frustrated by this great technical breakthrough made by the Americans (with help from the British and from political European refugees.) He informed his scientists in no uncertain terms that the next such breakthrough had better be Soviet. He planned to do exactly what the U.S. had done: Find a new area for a great technical breakthrough and superweapon, put the entire resources of the nation behind it, develop it in great secrecy, and thrust it upon the U.S. and its allies at the eleventh hour. The West would then be forced to capitulate, just as was Japan. We had already shown Stalin the successful scenario by which to win the next war.

Ironically, Stalin's "great technical breakthrough" was to come from Germany's radar scientific team, taken to the Soviet Union after the war. This team had drastically advanced the theory of radar cross section and radar absorbing material (RAM). They were on the verge of discovering phase conjugate time reversed radar waves—which would enable the great new superweapons Stalin sought.

Meanwhile, the Soviets plotted a delaying campaign until they were ready to strike the West. Furious action was required to catch up to the U.S. in atomic weaponry. Obviously it was only a matter of time until long range rockets, as evidenced by the German V1 and V2, would be mated to atomic warheads, thrusting the decisive role of artillery into the strategic arena, far beyond the wildest imagination of then-current thinking. Also, air defenses against the American and British bombers were desperately needed. Guided rockets capable of shooting down American bombers enroute to critical Soviet areas were an absolute necessity. Atomic warheads were needed against massed bomber fleets, as had been thrown against Germany during the war.

The Soviet state must launch a superhuman effort to rapidly achieve its desperately needed missiles and atomic weapons, for it was totally vulnerable until that had been achieved. Meanwhile, the old methods that had proven so effective when one cannot fight a stronger foe head-on— guerrilla warfare, insurgency, and terrorism—must now be massively employed on a global scale to focus the attention and physical exertion of the U.S. dragon elsewhere. Third party "wars of attrition" would threaten American interests around the globe, and U.S. forces would be siphoned off in debilitating struggles against guerrilla wars and in distant lands. These sapping wars would "bleed the dragon" and weaken it, while the Soviet Union prepared a special technical sword with which to administer the final coup de grace.

Stalin was an absolute dictator, brooked no opposition, and killed his opposition. Knowing what was good for them, the Soviet Academicians did not dare to debate or protest against his ultimatum to search every field of knowledge, no matter what. Instead, Academy scientists vigorously turned to a massive search for the new breakthrough area. Scientific literature from the West was hauled to Russia by the shipload. Thousands of Soviet PhDs and engineers were put to work in huge analysis institutes, sifting through the literature and digesting it—and carefully noting anomalies and areas which should be followed up. Nothing even remotely approaching such a technical digestion and analysis effort has ever been attempted in the West.*

**From this search it seems clear that the Soviet discovered Whittaker's 1903 and 1904 papers also prescribing the engineering method.*

Two short years after WWII, Soviet planning for Stalin's new thrust was finalized, and the cold war was launched around the world. A great dialog began among the leading Soviet military leaders to hammer out radically new strategy for utilization of new weapons of mass destruction. Feverish effort to develop and deploy the first defensive missiles was underway, as was a crash effort to develop long range ballistic missiles, large bombers and atomic weapons. At the time, German and Soviet radar scientists probably began to

discover—and puzzle over and work out the theory and hardware for time-reversed EM waves and phase conjugate mirrors.

The Moray drawings (and related agent reports) must have been resurrected. Nikola Tesla's notes, taken from his hotel room at his death in 1943 and later turned over to Yugoslavia, must have passed into Soviet hands also. Soviet espionage was quite successful in easing the task of developing atomic weapons. Soviet rocketry, funded and staffed massively, forged ahead, particularly in big rockets and solid propellants. The great postwar arms race was on, so far as the Russians were concerned.

Several years after WWII, then, the Soviets should have been embarked on experimentation with a Moray prototype amplifier. They should have been deeply involved in time-reversed EM wave experimentation to rediscover what Tesla actually had done in wireless transmission of energy without loss. Also, the earlier Kaluza-Klein unified electromagnetics and gravitation theory (1921-1926) could not have eluded the Soviet scientists, who have consistently led the world in nonlinear mathematics. Of necessity, the search for a new breakthrough area would have initiated intensive review of the foundations of physics and electromagnetics, in an effort to discover any "holes" that might exist. Thus the short debate at the turn of the century, that established Heaviside's limited version of *Maxwell's EM theory*—largely because of Western repugnance for Maxwell's use of Hamilton's difficult quaternions—would not have gone undetected. Careful review of that situation would immediately have revealed that

(1) Maxwell's theory, which was worked out in quaternions rather than vectors, had actually not been completely captured by its translation into Heaviside's vectors by none other than Heaviside himself. [Heaviside was the cofounder of modern vector analysis and almost single-handedly produced what today is the recognized vector form of Maxwell's equations. He also nearly single-handedly transformed Maxwell's theory into its modern form.]

(2) The effects of stresses in the vacuum medium had been eliminated by Heaviside, while Maxwell certainly had pointed out additional terms required to address this issue. [A Soviet team addressing this omission, would have inevitably connected it to Whittaker and Kaluza-Klein theories, revealing electrogravitation (scalar electromagnetics).]

(3) A quaternion, which contains a scalar part in addition to a vector part, could maintain (*and even vary and oscillate, its internal EM stress*) its non-zero scalar part when the vector was zeroed, whereas in vector analysis, when the vector is zeroed, it is assumed that no residue exists. [This is also directly connected with the mistaken assumption that an abstract vector space itself can have no substructure.]

(4) The direct connection could be made with Whittaker theory to produce scalar vacuum stress gravitation when the EM vector fields were zeroed.

(5) The West had missed this unified theory because of its total aversion to quaternions, and its elevation of the curtailed Maxwell's theory to cult status.

(6) Investigative experiments to explore bucking EM force fields which neatly zero sum would have almost immediately revealed highly anomalous behavior of materials and circuits. [Such simple investigations of zero-vector EM force field summation do not seem to appear in the Western literature at all, so far as can yet be established.]***

****with the single exception of the Aharonov-Bohm effect, which has finally been proved after 27 years of controversy, and Hooper's work which was obscurely published.*

Something very much like that, together with quantum mechanical ideas, would have had to be applied to explain the operation of the Moray device. Note that every one of the suppositions above was available to any thorough Soviet search—and the Soviet scientists certainly made the search, more massively and thoroughly than has ever been done before or since. Since the evidence is overwhelming that the Soviet scientists developed electrogravitation and scalar EM weapons, it seems logical that their search succeeded along these lines or similarly.

About 1950-1952, the Soviets developed EM machines that could influence the brain and nervous system directly. This included *the Lida machine*, which can induce a catatonic state into a mammal such as a man, a cat, etc. U.S. scientists, obtaining one of these devices in the 1980s, reported that it utilized a 40 MHz carrier, and produced unusual waveforms (showing the multiple frequency content). Since the U.S. scientists do not possess scalar EM detectors, they have no measurements or knowledge of possible scalar components in the Lida's output signal. According to one U.S. scientist, the device was used by North Korean interrogators in brainwashing U.S. prisoners in North Korea during the Korean War, and was highly effective.

By the mid-50s, the Soviets should have been well along in prototype building, weaponizing, and development of larger devices and starting new weapons, based on what I have called:

- scalar electromagnetics— unified EM/gravity field theory a la Whittaker or simply
- electrogravitation using negative energy and time-reversed EM waves.

In the winter of 1957-58, a monstrous nuclear accident occurred at a Soviet facility in the Ural Mountains near Kyshtym. [Inexplicably, for decades U.S. intelligence analysts feverishly resisted—and even suppressed—the evidence in their possession, adamantly insisting that such an event never occurred.]. Witnesses reported that atomic wastes in the nearby storage site exploded. Since scalar EM research and development would have been underway in the Soviet Union for several years, we can construct a scenario that will produce that nuclear event: Suppose a large nearby radar had been modified to radiate a scalar EM wave. Suppose it is also used to produce a standing scalar EM wave, after Whittaker.

As the radar continues to radiate, such a standing scalar EM wave is "charged up" to a higher and higher "potential", just like charging a capacitor. That is, in the standing wave, its "locked-in energy density of vacuum" is being steadily increased, simply by continuing to transmit with the radar in the scalar EM mode. However, what is actually being "charged up" or produced is a gravitational potential standing wave (and this G-potential is increasing.) Further, suppose the radar and its attached standing scalar wave (G-potential) are energized, and suddenly the radar transmitter suffers an electrical failure. The "scalar potential" represented by the charged-up vacuum energy (which can be enormous) in the standing wave would immediately discharge to earth in a sharp electrogravitational pulse (EGP). When a strong EGP pulse— which is absorbed by, and reradiated from, atomic nuclei rather than orbital electrons—struck stored radioactive nuclear wastes, the radioactive nuclei would all decay immediately, just as if internally exposed to an atomic bomb. A full nuclear explosion of the stored nuclear wastes—in the dirt and dirty—would occur, creating a terrible nuclear "accident."

That is exactly what caused the Kyshtym accident in 1957-58. Failure of a large scalar EM transmitter produced a giant EGP "arc discharge" into the earth, striking the atomic wastes stored nearby. The resulting explosion and radioactive fallout contaminated a very large area, which is still contaminated to this day. Hundreds—perhaps thousands— of casualties resulted.

So we can be confident that, in 1958, the Soviets were already experimenting with large scalar EM Whittaker beam weapons. We can also be confident that, after the Kyshtym disaster, the Soviets immediately realized the cause of the accident, and developed safety circuits to hold the standing wave from collapse in the event of electrical failure of the transmitter. Means to slowly "drain off" the accumulated EG potential safely into the earth—much like slowly discharging a capacitor—would also have been developed and incorporated into the beam transmitter.

MICROWAVE RADIATION OF U.S. EMBASSY IN MOSCOW

BACKGROUND



- Began in latter 1950s
- Discovered on VP Nixon's trip
- Initially thought to be *nuclear* radiation (Discovered w/Geiger counter?)
- High level target -- U.S. Ambassador
- Guarantees personal attention of:
 - U.S. Ambassador to USSR
 - U.S. President
 - NSA, CIA, DIA, NSC, etc.
 - Top consulting scientists
 - Leading U.S. scientific institutions
- Two U.S. Ambassadors died, another sickened
- Anomalous health changes in personnel, only in zero-field (zero pot'l gradient) areas!
- Four U.S. Presidents requested Soviets cease
 - Cut from 18 watts/sq cm to 2
 - Then again increased
- No one could understand what was going on
- Aluminum screens were placed over windows
- Moscow was declared a hazardous duty zone



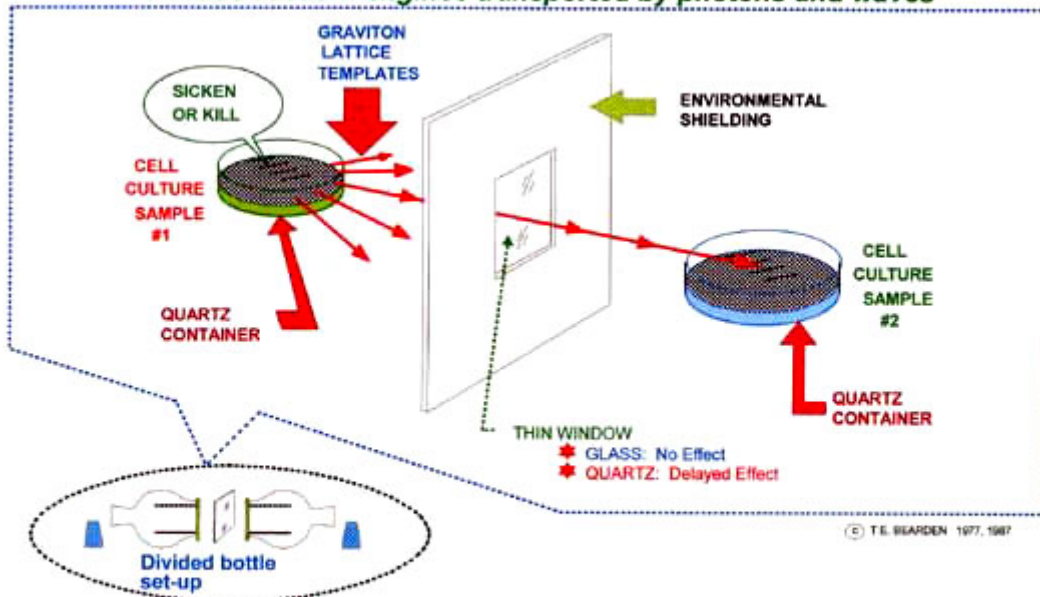
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Anomalous microwave radiation of the U.S. Embassy in Moscow began during the late 1950s (above image), and has repeatedly occurred to this day. Twin beams have been noted in the radiation, suggesting interferometry.

Scalar EM components on the carriers would not be detected by normal microwave instruments, although the weak carrier signals would. Further, the strength of the scalar EM wave's infolded components can be essentially independent of the strength of the carrier.

Apparently a wide variety of physical effects were experienced by personnel in the Embassy, including several U.S. Ambassadors.

Kaznachejev's Cytopathogenic Mirror Effect *Disease vacuum engines transported by photons and waves*



Note: Minimum lattice is one harmonic interval: IR to UV is such a minimum G-lattice.

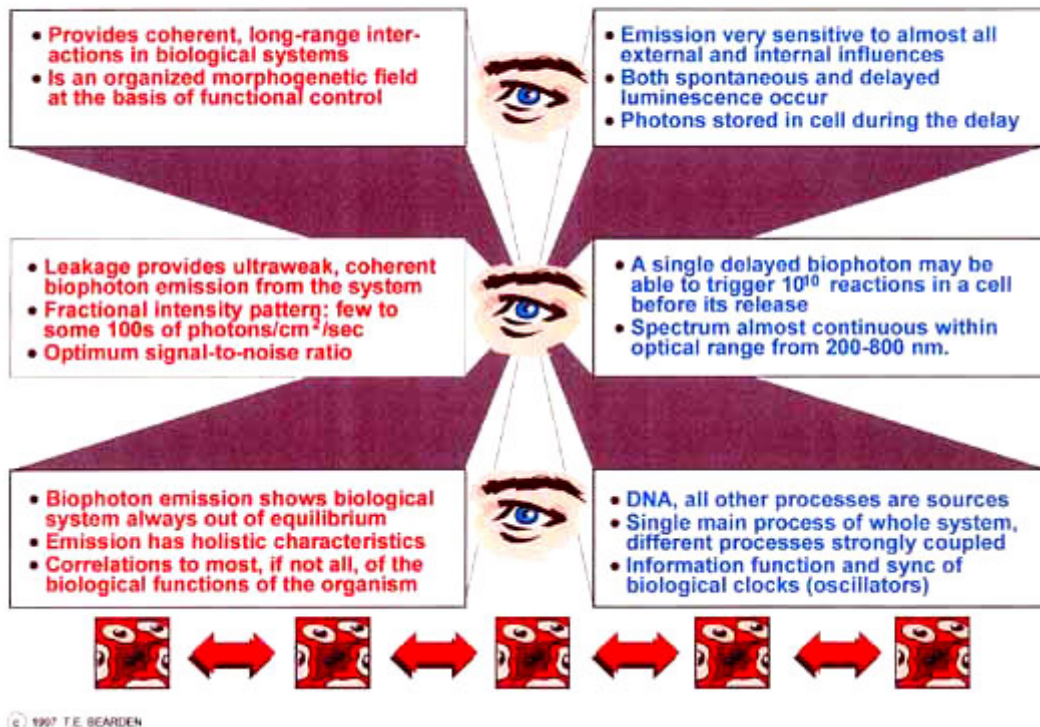
Distant induction of cellular death and diseases, by special EM means. Coupled photon-antiphoton pairs (gravitons) in a structured harmonic lattice ordering constitute the disease or disorder template.

[Note that extensive tests of the electromagnetic transmission of cellular disease patterns between cell cultures have been reported by Soviet researchers, led by Kaznachejev.

Kaznachejev reported that the effects were due to near-UV photons emitted by the diseased cells and irradiating the test cells (above image). Such effects have been replicated at the University of Marburg, West Germany, using infrared emissions from diseased cells to irradiate test samples.

At the University of Sydney, Australian researchers have accomplished the effect at a distance of over 100 feet, using what can only be called scalar EM radiation.].*

Popp's master cellular control system



*Dr. Fritz Popp has discovered the virtual-state (i.e., scalar EM!) master control communication system for the cells in the human body. (above image)

The "Moscow radiation" has represented an intelligence probe for all these years: radiating a high-level U.S. target—the U.S. Ambassador to the Soviet Union—and inducing physical effects assured the involvement of high U.S. governmental agencies and official, including the CIA, DIA, NSA, the National Security Council, and the President. Eventually, the U.S. scientific community would also be asked to evaluate the signals (for a full explanation, see T.E. Bearden, *Gravitobiology: A New Biophysics*. Aug. 1989).

The response of the U.S. Government and the counteractions taken (or not taken) at the U.S. Embassy in Moscow reveal whether or not the U.S. is aware of scalar electromagnetics and scalar interferometry, with very high confidence. Since apparently no U.S. scalar EM countermeasures have been taken at the Embassy, the Soviets have long been assured that the U.S. knows nothing of scalar EM, has not developed scalar EM weapons secretly, and possesses no defenses against the surprise use of scalar EM weapons against U.S. forces and installations.

In January 1960, Khrushchev announced the development of a new, fantastic weapon—one so powerful it could wipe out all life on earth if unrestrainedly used. *The New York Times* printed part of the story. Khrushchev, of course, was referring to the newly emerging scalar EM weapons. So in early 1960 the Soviets were in at least what we call the engineering development stage for large scalar EM beam weapons, which would be deployed when finished.

On May 1, 1960 Soviet defensive radars—rigged as prototype scalar EM beam weapons—probably downed Francis Gary Powers's high-flying U-2 reconnaissance plane over the Soviet Union, precipitating a major diplomatic incident. At the time, no Soviet surface to-air missile could reach the high-flying U-2, but of course it was extensively tracked on Soviet defense radars. Powers reported that a flash occurred behind his plane and persisted—almost certainly the signature of time reversed wave real-time holography. Eisenhower first denied, then was forced to admit, the photo-reconnaissance nature of Powers' mission when Khrushchev revealed that the Soviets had captured Powers alive. Khrushchev then cancelled a major summit meeting with

President Eisenhower. Powers was imprisoned, and released in February 1962 in exchange for Rudolf Abel, a convicted Soviet spy.

In the fall of 1962, with his new superweapons nearing deployment, the ebullient Khrushchev could no longer contain his eagerness. He "jumped the gun" and attempted to change the international balance of power at a single stroke. The Soviets started inserting MRBMs—weapons which would blanket the U.S. like a glove—into Cuba at a feverish pace. From information clandestinely fed by Soviet Col. Oleg Penkovsky, John F. Kennedy was aware that Khrushchev's bombers and ICBMs were in woeful shape (*Penkovsky knew nothing of the Soviet Weapons program in energetics, using time-reversed EM radar wave weapons*).

Not suspecting the Soviet superweapons, he knew that Khrushchev was bluffing—and proceeded to call the Soviet bluff, precipitating the *Cuban Missile Crisis*. Khrushchev was caught with his pants down. His superweapons were not yet ready, and the U.S. could have easily destroyed the Soviet Union. Reluctantly he backed down and removed the missiles, after first blustering enough to get an agreement from Kennedy not to attack Cuba.

In the Communist world, this was a serious loss of face by Khrushchev. He knew his days were numbered unless he did something dramatic to recoup stature.

Accordingly, as soon as his new superweapons were deployed and ready, Khrushchev did that "something dramatic." On April 10, 1963 he destroyed the U.S.S. Thresher (below image) with one of his new weapons.



Scalar EM (electrogravitational) beams, focused through the ocean to interfere on the Thresher under the surface, recreated spurious EM energy in the sub's electrical control circuits, jamming them so that the sub lost control, sank to crush depth, and imploded. Spurious electromagnetic "splatter" surrounding the immediate vicinity of the targeted area left a signature of intense EM interference with multiple systems and multiple frequencies of the U.S.S. Skylark, surface companion of the Thresher. This anomalous EM interference was so virulent that it required over 1-1/2 hours for the Skylark to transmit an emergency message back to headquarters that the sub had been lost.**** The death of the Thresher was Khrushchev's first blow.

**** Some electronic systems mysteriously malfunctioned, then later completely recovered spontaneously. This again is clearly a scalar EM weapon signature.

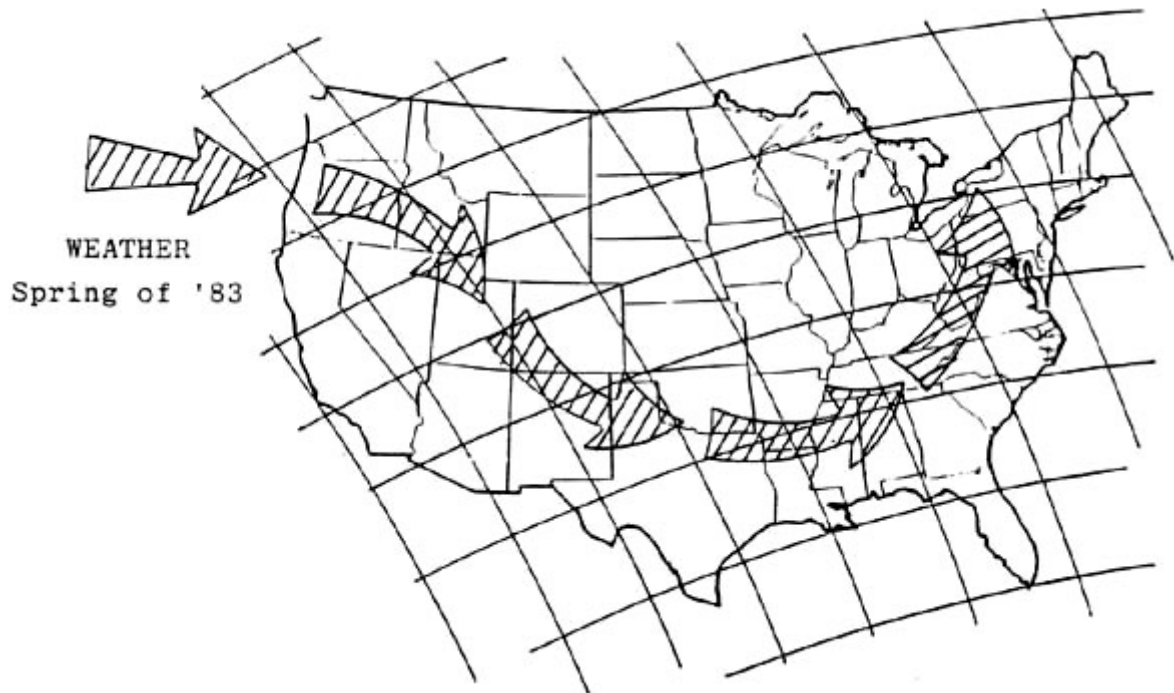
The next day, April 11, 1963, Khrushchev struck his second blow. Two deployed Soviet scalar EM weapons fired massive scalar EM pulses through the ocean. The two massive pulses met and interfered deep under the surface, 100 miles north of Puerto Rico. The resulting giant underwater EM explosion hurled a mushroom of water half a mile up into the air, and the anomalous explosion was observed (and later reported to the FBI and the Coast Guard) by the pilot and crew of a US. Jetliner passing nearby, enroute from Puerto Rico to Florida.

Thus we know the year—and indeed probably the very month—that Khrushchev's new "fantastic weapon" was deployed: April 1963.

In the 1960s, Curtis detected a previously unknown, anomalous, weak electromagnetic radiation pattern over the ocean. This is the type of pattern consistent with the introduction of scalar signals with a small' impure normal EM component or residue. Such cruder implementation would have been expected early-on in the Soviet program.

On June 17, 1966 from the air near Teheran, Iran, several airline pilots sighted a brilliant sphere of light, "sitting on the horizon," so to speak, deep within the Soviet Union. The intensely glowing sphere expanded to enormous size, dimming as it expanded, always remaining "sitting on the horizon." The pilots observed the phenomenon for 4 to 5 minutes.

A CIA report on the incident was released under the Freedom of Information Act.



In 1967-68, anomalous holes appeared in clouds over the U.S., possibly associated with the beginning of early Soviet weather engineering over the U.S. (above image). That winter was particularly severe.

Lisitsyn's Report: Brain Code Broken



- ★ **THEORY DEVELOPED AND FITTED**
- ★ **HYSTERESIS MEMORY LOOP**
- ★ **CONTROLLED EM INDUCTION**
 - **IMAGES**
 - **SENSATIONS**
 - **PREDETERMINED EMERGENCE**
- ★ **23 EEG BANDS**
 - **UP TO 8.1×10^{20} HZ**
 - **11 INDEPENDENT CHANNELS**

S.K. Lisitsyn, "New Approach to the Analysis of Electroencephalograms,"
DDC Report AD73005, p. 16-25.

JCS-34

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In the late 1960's, Lisitsyn reported that the Soviets had broken the "genetic code" of the human brain (above image). He stated the code had 44 digits or less, and the brain employed 22 frequency bands across nearly the whole EM spectrum. However, only 11 of the frequency bands were independent. This work implies that, if 11 or more correct frequency channels* can be "phase-locked" into the human brain, then it should be possible to drastically influence the thoughts, vision, physical functioning, emotions, and conscious state of the individual, even from a great distance.

*To translate this to VHF or radar/radio frequencies, see Bearden, *Gravitobiology*, 1989.

It may be highly significant that,

(1) up to 16 of the giant Soviet woodpecker carriers have been observed by Beck and others to carry a common, phase-locked 10-Hz modulation, and

(2) such a 10-Hz signal has been demonstrated by Beck, Rauscher, Bise, and others to be able to physically entrain or "phase-lock" the human brain, if stronger than the Schumann resonance of the Earth's magnetic field.

A human brain entrained by a common, phase-locked 10-Hz modulation on 16 carrier frequencies would effectively have 16 frequency channels phase-locked into it. The potential for using the Woodpecker transmitters to phase-lock an appreciable percentage of human brains in a targeted area, and then induce effects in the populace similar to— and even more drastic than—the effects induced in U.S. Embassy personnel in Moscow, should be strongly pointed out. Coupled with the Kaznacheyev work on EM transmission of cellular death and disease, using the Woodpecker signals to induce death and disease in the targeted populace may also be a distinct possibility. Modification of DNA/RNA—and viruses themselves—is also a possibility.

Many other Soviet scalar EM testing incidents are documented in Bearden, *Fer-de-Lance*. 1986, and in *AIDS: Biological Warfare*. 1988. Repeated presentations on the Soviet scalar EM weapons and their testing have been given at national symposia since 1978. The exact mechanisms utilized by these superweapons have also been given. A complete and consistent series of many anomalous events exists over the years, showing the continuing development, testing, and deployment of massive scalar EM weapons by the Soviet Union.

Actual use of the weapons to create a giant interference grid over the U.S. and severely affect world weather (above image) is documented in a videotape, Bearden, Soviet Weather Engineering Over North America, 1985.

The above videotape also includes several other major accidents, and also U.S. weather satellite photographs of anomalous exhausts from the *Soviet Union's Bennett Island* (which actually belongs to the U.S.). The exhausts are often in jets 150 miles long and nearly horizontal (about a degree and a half in elevation). They have been photographed coming from Bennett Island and the sea nearby, since 1974.

Note that Bennett Island need not be the site of the actual scalar EM weapon itself. Energy extracted by a scalar EM howitzer (endothermic mode) from a distant region could be caught temporarily, then "relay fired" to Bennett Island by the same howitzer, switched into its exothermic mode. Thus the howitzer could act as an energy transmission relay between a distant endothermic target site and a separate distant exothermic exhaust site such as Bennett Island. Such exhausts have also been photographed coming from Novaya Zemlya.

On January 23, 1974 a mysterious explosion over North Wales rocked a 60-miles radius area.

Associated anomalous light phenomena were also seen. Hundreds of anomalous booms, aerial rumbles, and aerial explosions, many accompanied by flashes or anomalous shaking of ground structures, buildings, windows, etc., have occurred over the U.S. and other Western nations in the 60s, 70s, and 80s. Many were simply Soviet tests.

In June 1975, Brezhnev called for a ban on weapons of mass destruction more terrifying than nuclear arms. He stated the need for an "insurmountable barrier" to the development of such weapons. In July he repeated his strange proposal to a group of visiting U.S. Senators. Ponomarev, a Soviet national party secretary, again raised the same issue to a delegation of visiting U.S. congressmen in August. At the United Nations' thirtieth Session of the General Assembly on Sept. 23, 1975, Foreign Minister Andrei A. Gromyko strongly raised the same issue, warning that science can produce "ominous" new weapons of mass destruction.

He urged that all countries, led first by the major powers, should sign an agreement to ban the development of these unspecified new weapons. He even offered a draft, entitled "*Prohibition of the Development and Manufacture of New Types of Weapons of Mass Annihilation and of New Systems of Such Weapons.*" The first article provided that the types of these new weapons would be "specified through negotiations on the subject." By its fixation on nuclear weapons and its ignorance of scalar EM, the West may have lost its only opportunity to prevent the spread of scalar EM weapons "more frightful than the mind of man has ever imagined," to use Brezhnev's characterization.

With obvious lack of knowledge of scalar EM weaponry by the West and failure to achieve a total ban, the Soviet hawks again were able to prevail over Brezhnev and the more conservative Party leaders. The Soviets decided upon a massive buildup of arms, with the intention of being prepared to dominate the world in a decade.

In July 1976, communications around the Earth were interrupted by the sudden emergence of powerful Soviet transmissions in the communications band, from 3-30MHz. The chirped signal produces a characteristic sound in a receiver similar to a woodpecker's beak hitting a wooden block. The transmitters were immediately dubbed "woodpeckers", and the signals "woodpecker signals."

The Western intelligence community dubbed these giant transmitting systems "over-the-horizon radars." These powerful systems were brought on full deployment and activated after the Soviets decided to go ahead with a decade-long buildup to prepare to dominate the earth. That decision was reached after Brezhnev's 1975 failure to obtain world agreement banning development of scalar EM weapons.

Activation of the giant Soviet Woodpecker weapon systems meant that the Soviet Union now would deploy massive scalar weapons on an unparalleled scale.

On July 28, 1976, a great earthquake destroyed Tangshan, China, killing some 600,000 persons. Just before the first tremor in the early morning, the sky lit up like daylight, with multi-hued lights seen up to 200 miles

away. Electrical signals were also associated with the quake. Note that, in 1912, Nikola Tesla stated in an interview that it would be possible to split the planet, by combining vibrations with the correct resonance of the earth itself. Tesla stated,

"Within a few weeks, I could set the earth's crust into such a state of vibrations that it would rise and fall hundreds of feet, throwing rivers out of their beds, wrecking buildings, and practically destroying civilization. The principle cannot fail..."

Tesla once set off a growing local vibration and shaking of the entire neighborhood around his laboratory, using a 10-lb. device. Tesla later improved on his concepts, calling this area "telegeodynamics". In 1935 he said:

"The rhythmical vibrations pass through the earth with almost no loss of energy... It becomes possible to convey mechanical effects to the greatest terrestrial distances and produce all kinds of unique effects... The invention could be used with destructive effect in war..."

Later in 1976 Soviet scientists increased the power of the giant transmitters to perhaps 40 megawatts each. The scalar EM power contained in the normal EM carriers is unknown. Transmitting pulses at about 7 Hz, it appears that enormous standing waves were inadvertently set up in-phase in the atmospheric duct around the earth. That is, the powerful carriers were circling the earth about 7 times per second, coming back around in phase with the previous loop. The scalar content also was in phase.

The in-phase scalar component apparently produced the phenomenon of "kindling"; i.e., of "charging up" the loop with Whittaker (1903) gravity potential. This potential was perfectly in phase with the cavity resonance of the earth-ionosphere, and so the liquid-filled crustal features of the earth and the ionosphere coupled to it. In short, the potential became self sustaining, and increasing as long as the transmitters kept pouring in carrier power. The result was giant standing waves of totally unsuspected magnitude.

The frightened Russians hurriedly turned off the transmitters, but were then faced with an undamped, sustained oscillation of the giant potential. Thoroughly frightened, the Soviets radiated intense bursts of power at the waves, trying to break up their coherence. According to one source, these waves lasted several months under that bombardment before gradually dissipating. Note that experiments by Dr. Robert Helliwell at the U.S. Antarctic research camp known as Siple Station has shown fairly conclusively that radio waves can be magnified up to 1,000 times or more in the ionosphere, according to reports in the open literature.

On September 10, 1976, the crew and passengers of British European Airway Flight 831, over Lithuania enroute from Moscow to London, observed an intensely glowing, stationary ball of light above the clouds underneath the plane. When alerted by the airline pilot, Soviet authorities on the ground curtly informed him to pay no attention and, effectively, to exit the area. This Soviet reaction indicates that the incident may have been a Soviet test of an unknown type of device—in short, a scalar EM interferometer. If so, the interferometer intersection zone was deliberately placed near the aircraft to stimulate the crew and passengers. By the later reaction of the British government to the incident, the Soviets could ascertain whether or not Britain was cognizant of scalar electromagnetics.

On May 18, 1977, the Soviets signed an agreement with the U.S. and 29 other countries, promising not to attack each other by causing man-made storms, earthquakes, or tidal waves. The Soviets had already tested weather control against the U.S. in 1967 and had been steadily using it against America for almost a year.

On April 2, 1978, an anomalous straight, not jagged, beam of "lightning" came down from the sky at a 45 degree angle to the ground and struck Bell Island, Newfoundland, causing a loud explosion and damage to some houses, etc. Two cup-shaped holes about two feet deep and three feet wide marked the major impact. Wires leading to a shed and coop nearby were vaporized. Both structures suffered considerable damage, but no burning occurred except for a slightly scorched spruce tree.

The anomalous bolt did not discharge into prominent metal contact points, such as a metal chimney running down to an iron stove. Instead, all the wiring on the property was blown out. A number of TV sets in Lance Cove, the surrounding community, also exploded at the time of the blast. Weather men confirmed that atmospheric conditions at the time were not conducive to lightning. The blast was heard 45 kilometers away

in Cape Broyle. Apparently U.S. Vela satellites picked up the event. The incident was investigated promptly by two representatives from a U.S. weapons laboratory at Los Alamos, according to the news media.

On Nov. 21, 1977, cloud indications of a huge standing wave was observed off the Pacific coast of America, reaching from Alaska to Chile. Satellite photos show cloud banks over this stretch of the ocean, lying offshore, and reaching for the whole of the distance. These clouds grazed the land slightly at California. There a straight black line, as through drawn by a ruler, appeared in the cloud mass. It was an opening in the clouds, one mile wide and 200 miles long. There was no known explanation. This was a phenomenon without parallel in past records.

A series of anomalous high altitude booms occurred off the East coast of the U.S. around the end of the year in 1977-78, though some activity had started as early as July 1977. Flashes associated with some of the booms were observed. On Dec. 27, President Carter called for a full report. No reason could be found. These explosions represented adjustment of the interference grid that had been established over the U.S. by the crossed Woodpecker beams, and artillery-type high burst registration of scalar EM howitzers. Numerous other adjustments of the grid and registration of howitzers have occurred over the U.S.

The peculiar "nuclear flashes" seen by the Vela satellites in September 1979 and December 1980 could have been due to a testing of a scalar EM howitzer in the pulsed exothermic mode. In the mode, scalar EM pulses meet at a distance, where their interference produces a sharp electromagnetic explosion (hence the "flash", very similar to the initial EMP flash of a nuclear explosion. Even in the vacuum of space, such an explosive eruption of energy from within the local spacetime vacuum itself may be expected to lift matter from *the Dirac sea*, producing a plasma. Prompt absorption and re-radiation of energy from this sudden plasma may be expected to present nearly the same "double peak" profile as does a nuclear explosion. This was the profile presented by the flashes. Note that the second flash detected was apparently of an "explosion" primarily in the infrared, almost certainly ruling out a conventional nuclear event. It does not rule out, however, pulsed distant holography using pumped EM giant time-reversed wave transmitters.

From Afghanistan in September 1979, British war cameraman Nick Downie observed gigantic, expanding spheres of light deep within the Soviet Union, toward the direction of Saryshagan missile test range. Saryshagan apparently contains at least one directed energy or particle beam installation which could possibly function as a scalar interferometer/scalar EM howitzer. Downie observed multiple incidents in the direction of Saryshagan during the actual month (September 1979) that the first anomalous flash was detected by U.S. Vela satellites.

On the other hand, there also exists tenuous evidence that these Vela events may have been associated with weaponry of another nation, not hostile to the U.S. There is evidence that this second nation also possesses scalar EM weapons, as do two additional nations besides the Soviet Union.

In latter 1980, a most anomalous drought was induced in the United States. On Feb. 2, 1981, the Washington Post commented:

"For the past four months, a single weather pattern has gripped virtually the entire United States, causing a coast-to-coast drought unique in the annals of weather recording... The weather system causing the drought is one of the most unusual national patterns ever recorded."

It was also one of the most artificial ones ever recorded!

On January 20-21, 1982 a swarm of more than 1,400 earth tremors occurred in that two-day period in north central Arkansas. Beginning on Jan. 12, activity had started in the swarm area, and three quakes registering above above 4.0 on the Richter scalar were recorded. The strongest was on Jan 20, and measured 4.5. There had been no previous recorded earth tremors in the area. Long dormant faults near the Ouachita Mountains were suspected as being responsible. Note that strong scalar waves, passing through the Ouachita fault zones, could have stimulated such activity, since a fault is a natural scalar interferometer and thus a scalar transmitter/receiver. Scalar reception would result in increased electricity in the rocks in the fault zone, in turn increasing the mechanical pressure in the rocks. Since the Soviets were heavily engaged in scalar EM weather engineering operations over North America in 1982, these tremors may have been side effects of those operations.

On June 18, 1982, pilots and crews of Japan Air Lines Flights 403 and 421 reported sighting a giant, expanding globe of light in the North Pacific, 700 kilometers east of Kushiro. This was another test of a scalar EM howitzer/interferometer producing a "giant globular shell" of energy at a great distance. When small, the intense shell produces a very high EGP and also a very high EMP inside the matter of any object penetrating the shell. The EMP will dud any and all electronic equipment; explode high explosives, fuels, and combustibles; and render any modern weapon harmless. The high EGP will detonate a nuclear warhead immediately in a "full-up" nuclear detonation. It will also instantly kill any living creature, including every cell, bacterium, virus, and organism in its body. It will also detonate any ordinary, non-radioactive material with a low-order nuclear detonation of all its nuclei. As the globular shell is made very large, "energy density" in its shell is reduced. However, any nuclear material or device will still suffer a low-order nuclear detonation from the EGP, and any biological system will still be instantly killed. The EMP will still dud any electromagnetic equipment presently made. As can be seen, the globe can be used to defend an entire sector of the sky against any kind of incoming threat—with 100% effectiveness. A hemispherical shield can be placed over one's own field army for terminal stage defense, and/or over the opposing force for initial phase defense, against most everything!

On July 20, 1982, Soviet official Lysenko of the Soviet Embassy in Washington, D.C. stated publicly that, should nuclear disarmament fail, the Soviets would quickly introduce new weapons more powerful than nuclear arms, and these weapons would not be verifiable. U.S. Army Col. John Alexander, together with this author, was in the audience and heard Lysenko's statement.

In latter December, 1982, odd, anomalous atmospheric booms occurred over Ohio. These represented tests and adjustments of the scalar EM interference grid over the U.S. and the probable registration of scalar EM howitzers used in conjunction with the grid. (See FDL for complete details of this grid weapon.)

Anomalous "laser blinding" of U.S. satellites over the Soviet Union has occurred on several occasions. On one occasion, a satellite was blinded for up to four hours. While such non-damaging blinding would be difficult for a ground-based laser to accomplish, it would be simple for a scalar EM interferometer—or a ground-based scalar EM laser—to accomplish, since the amount of energy deposited upon and within the satellite could be precisely controlled and even directly monitored. A possibly related anomalous temporary disabling of two or three power supplies has been demonstrated upon the British satellite Ariel 6 when passing over British Columbia or the Caspian Sea, if the sun is shining.

In mid-January, 1983, so-called "sonic booms" shook the air over Pennsylvania.

In latter February, 1983 anomalous booms occurred over New York, and anomalous tremors shook the Mississippi Gulf Coast. Anomalous booms also shook Ohio.

On April 9, 1984 a gigantic mushroom cloud—glowing, like a "halo"—rapidly emerged from above the ocean off the coast of Japan. The cloud grew to 60,000 feet or so within two minutes, and reached an enormous diameter estimated at 200 miles. Several Boeing 747 jet airliners were in the general vicinity; at least one of them was piloted by a former B-52 pilot who took evasive action, since the phenomenon resembled a giant nuclear explosion. However, there was no blinding flash of light, and no massive shock wave overlook the aircraft. Walker *et al* investigated the seismic and underwater acoustic instrumentation data surrounding the period of the incident, and essentially ruled out all known natural phenomena. They concluded that the incident was either an as yet unknown natural phenomenon or man-made explosion. In fact, it was very probably a test of a giant scalar EM howitzer, used in the endothermic (heat energy withdrawing) mode.

Sudden energy withdrawal in a region above the ocean resulted in a sudden low pressure, sucking up a giant cloud of moisture. Inrushing air pushed the cloud upward into a giant mushroom, much like a giant expanding thundercloud anvil wells up when it forms, only faster. Walker and colleagues have again examined the reported position of the cloud, and placed it much nearer to the Soviet Union—between the Kurils and Sakhalin. Four stages were observed:

- (1) a towering, cumulus-like cloud rose out of the stratiform layer,
- (2) the cloud tower faded and was replaced with a small semicircular halo segment,
- (3) the halo expanded to a full circle, and
- (4) the halo expanded further and dissipated.

The diameter of the halo at maximum size is now estimated to have been at least 380 miles, and the altitude of its center (at maximum size) is estimated to have been greater than 200 miles.

Note that the upper edge of the shell would have been at an altitude greater than 380 miles. This sort of "*Tesla shield*" is an antimissile and antiaircraft defense shield. Any object penetrating the shell receives both an electrogravitational pulse (EGP) and electromagnetic pulse (EMP) arising inside it, from within its local spacetime. The EMP will dud all electronics and explode all high explosive (HE) materials. EMI shielding is ineffectual, since the EM energy pulse arises everywhere within the vehicle, warhead, and circuitry from spacetime itself. The EGP will immediately fission radioactive material. If a strong EGP is experienced, a nuclear warhead or warheads will explode "full order", instantly. In fact, even the nuclei of ordinary, nonradioactive material struck by a strong EGP will fission in a low order nuclear explosion.

In the "small shell" or "small globe" variant, a sufficiently strong EGP will be experienced by a penetrating object to cause full order detonation of nuclear warheads. In the "large shell" or "large globe" variant, a weaker EGP will be experienced, causing low order detonation or merely disruption of nuclear warheads (*It will also explode fuel, propellants, and HE explosives, dud all electronics, kill all personnel, etc. at the same time*). As can be seen this defense weapon is effective against all types of warheads (nuclear, HE, etc.) and all types of penetrating vehicles (bombers, ballistic missiles, cruise missiles, RPVs, artillery shells, etc.). The 1968 statement in *Voyennaya Strategiya* (Military Strategy) by V.D. Sokolovskiy that 100 percent defense against missiles and aircraft is possible, and that this capability had been achieved by the Soviet Union, but not by the West, is true.

Thus the incident apparently represents three tests in one:

- (1) the initial "cold explosion," or test of the howitzer in the endothermic mode
- (2) the immediate switching of the howitzer to the exothermic mode and creation of a small hemispherical shell of energy (Tesla shield)
- (3) the shield was then expanded into a globular shell, and expanded to giant size

The globular part of the exothermic test was very similar to the Soviet test observed from Teheran on June 17, 1966. The glowing hemispherical shell was similar to several previous Soviet tests observe over the ocean and reported in the open literature. For example, on Mar. 24, 1977, the H.M.V. Kinpurnie Castle observed a large, moderately luminous hemisphere of light formed over the ocean, and the formation of two luminous patches or globes, one inside the hemisphere and one outside. The phenomena disappeared after 10 minutes. The gigantic incident off the coast of Japan on April 9, 1984 was indeed the testing of a giant Soviet scalar EM weapon.

On the night of July 26, 1984, the pilot and crew of a Boeing 747 (American carrier) flying from Tokyo to Fairbanks, near the Kuril Islands, noticed a slowly expanding hemisphere of white light off to their left above the horizon. The shell of light continued to expand over a 10 minute period until ahead of them and to the right. The crew braced for a shock wave which never arrived. Their weather radar saw nothing out of the ordinary. The shell of light had sharp edges and was semitransparent so that stars became visible through it. This was another Soviet test of the Tesla shield. Numerous sightings of this phenomenon have been made by airline pilots flying in and out of Japan.

In early December 1984, significant adjustments of the scalar EM interference grid occurred. In the vicinity of Los Angeles and San Diego, anomalous aerial phenomena such as explosions, rumblings, airquakes, and buildings and windows shaking without seismic disturbances occurred. A sharp and unexpected weather front appeared, racking the area with high winds on the night of Dec. 12, producing wide-spread damage and power outages. The newly-formed front, steered by the dynamic Soviet woodpecker grid, moved on to produce significant snowstorms in other areas; even Tucson received a snow "dump" of 20 inches. Prior to the Dec. 12 anomalous weather front, this author accurately predicted an impending sudden drastic change in the weather in a brief interview over *Radio station KABC*, Los Angeles after the Dec. 8-9 anomalous aerial and ground structure disturbances. Complete explanation of Soviet weather engineering is given in Bearden, "*Soviet Weather Engineering Over North America*," 1985, 1-hr. videotape.

In January 1985, an incident of U.S. Navy-dispensed chaff drifting toward San Diego, California from off-coast was associated with significant failures of electrical systems and components in the city. Power was interrupted to as many as 60,000 homes. A specialized structure such as a piece of sophisticated chaff will

reflect scalar waves of frequencies within its cut bandwidth. If scalar frequencies within the chaff bandwidth were present on the Woodpecker carrier grid above and surrounding San Diego, a myriad of reflecting bits of chaff in the moving chaff cloud would produce myriads of random, invisible "fireflies" of electromagnetic energy kindling at a distance, from randomized scalar interferometry, in a zone surrounding the cloud. As these "firefly" pulses of EM energy occurred inside components of the electrical system, interference would occur, leading to anomalous electrical failures. That is apparently exactly what happened.

In February, 1985 a China Airlines Boeing 747 aircraft enroute to Los Angeles suffered anomalous engine flameout. The jetliner fell 32,000 feet, and the pilot finally managed to restart the engines and make an emergency landing in San Francisco. In the incident, different instruments apparently disagreed with each other, and disagreed with the observations of the pilot and crew. This is a direct indication of the test of one type of scalar EM weapon detailed in Fer-de-Lance. Only a "mild" test was conducted, as the Soviets apparently did not yet wish to actually destroy the aircraft.*

**Scalar interferometry (endothermic mode) causes electrostatic cooling in the internal combustion gases of the jet turbines. This reduces the pressure, and the thrust. When cooled sufficiently, the engines flame out and fail. They cannot be restarted until the scalar charge has time to drain away.*

We mention in passing that, in 1972, at a secret meeting of the leaders of the communist parties of Europe, Brezhnev named the year 1985 as the target year that the Soviets would be free to do as they will, anywhere on the globe. He stated that by that year the Soviet Union would control the oceans, the atmosphere, and 90% of the land area. We accent that he said control, not invade, conquer or occupy. [In 1960, Khrushchev also laid out a time schedule that focused on readiness, with technical superiority, in 1985.]

In latter April, 1985, Frank Golden discovered the rather sudden Soviet activation of 54 powerful scalar EM frequencies (27 pairs, each pair 12 kilohertz apart) transmitted into the earth and utilized to stimulate the earth into forced electrogravitational resonance on all 54 frequencies. These represented 27 giant "power taps" into the earth, each tap extracting enormous energy from the molten core of the earth itself, and turning it into ordinary electrical power. Each giant tap is capable of powering 4 to 6 of the largest scalar EM howitzers possessed by the Soviet Union.

In and around May Day 1985, the Soviets conducted a massive, "full up" strategy exercise of the scalar EM weapon systems and communications strategic exercise, monitored by Frank Golden (and for several hours, by the author.). For the May Day 1985 celebration, the 40th anniversary of the end of WWII, the Soviets conducted a full-up demonstration of the scalar EM superweapons armada for Gorbachev, the recently selected leader. Apparently over 100 giant scalar EM weapons were activated. Twenty-seven gigantic "power taps" were established by resonating the earth electrogravitationally on 54 frequencies (27 pairs where the two are separated from each other by 12 kHz.). By alternating the potentials and loads of each of the two paired transmitters, electrical energy—in enormous amounts—can be extracted from the earth itself, fed by the "giant cathode" that is the earth's molten core. Scalar EM command and control systems, including high data rate communications with underwater submarines, were also activated on a massive scale. The exercise went on for several days, as power taps were switched in and out, and command and control systems went up and down. This exercise represented the achievement of Brezhnev's 1972 statement that by 1985 the Soviets would be prepared to do as they wish, anywhere in the world.

August 28, 1985. A Titan 34-D missile launched from Vandenberg Air Force Base blew up after launch. The loss has officially been attributed to failure of a high-powered fuel pump, causing a massive oxidizer leak and a smaller fuel leak. While the Soviets may have used a small EM missile to disable the pump, no evidence is available at this time to support that hypothesis. Note, however, that the loss date is well after the complete exercise of all the Soviet strategic weapons in late April-early May. It is also within the time of the "anomalous booms" accompanying full-up testing of the Soviet prelaunch ABM/antibomber system against shuttle launches from Cape Canaveral. The Soviets may very well have decided to test the first actual "quickest reaction time possible" destruction of a real, launched US. missile in August, 1985, followed by the decision to test the first actual "quickest reaction time possible" destruction of a real aircraft (simulated bomber) in December, 1985.

Nov. 26, 1985. Launch of the shuttle Atlantis occurred in the evening at Cape Canaveral. A mysterious light was hanging in the sky; it was the marker beacon for registration of a Soviet prelaunch phase ABM/antibomber system. Just prior to launch, an EM missile strike occurred in the vicinity, as an offset test of

an associated scalar interferometer in the exothermic mode. A photograph of the anomalous incident is highly suggestive of just such an EM missile. Twelve minutes after launch when the shuttle was safely down range and out of the way, a huge atmospheric, rumbling explosion occurred over the area, and was heard for hundreds of miles up and down the coast. This represented the test of the "multiple missile launch" kill mode of the weapon system. The marker beacon, seen by hundreds of persons, was photographed as it was slewed away by the distant Soviet operator. Many booms and rumbles have occurred over Florida for several years, as the Soviets adjusted and tested the various modes of the scalar EM grid weapon system. The shuttle launch on Nov. 26, 1985 was the third shuttle launch in which the giant explosion occurred over the area some minutes after launch. The Soviets were using the shuttle launches as a convenient simulation of a "missile target launch", against which to test their prelaunch ABM/antibomber system.

On Dec. 12, 1985 the same Soviet weapon tested against the previous NASA shuttle launches and against various aircraft deliberately destroy an Arrow DC-8 taking off from Gander Air Force Base, Newfoundland. At lift-off, the aircraft—carrying over 258 U.S. marines and aircrew—lost power and sank into the ground tail-low, killing everyone on board.*

** An anomalous hole - characteristic of an electrogravitational (scalar EM) strike - was in a section of the fuselage ahead of the engines.*

It was a tragedy of enormous proportions, and especially to the families and friends of the brave servicemen and crewmembers who lost their lives. Three Canadian witnesses to the crash were interviewed over the Canadian Broadcast network television news on April 8, 1986 at 10:00 p.m. No flame or smoke issued from the plane before its descent and crash. However, the witnesses reported that the aircraft was mysteriously glowing with a yellow or orange halo. That is a signature of the use of a scalar EM howitzer in the "continuous EM emergence" mode, similar to the manner in which several F-111's were downed in Vietnam. DC-8's electrical systems were interfered with by EM energy and EM jamming noise created throughout each increment of spacetime occupied by the aircraft.

A powerful charge was rapidly built up on the aircraft structures and skin. The "yellow glow" seen by the witnesses was a corona due to the skin of the aircraft acquiring a high electrical charge. The loss of the engines was probably due to the distant Soviet operator applying a localized endothermic (energy extraction) beam to the engines. In fact, one eyewitness actually saw the crossed, glowing beams form in the clouds and a ball or beam of light then go from that glow and strike the aircraft. Instant fire to the plastics inside the aircraft occurred, emitting deadly gases. Half the occupants died of cyanide inhalation before the aircraft struck the ground and exploded. The stricken airliner passed directly over one observer who heard its engines roaring in painful labor, rather than with the full-throated roar of normal power. The distant Russian operator/gunner apparently tracked the aircraft down the runway, using two modes against it:

- (1) energy interference
- (2) energy extraction.

On Jan. 1, 1986, a startled Frank Golden detected—and physically verified with a special technique—that a metal softening scalar EM signal had been added onto the Soviet Woodpecker signals. Thus, at that time the Soviet Union was preparing to exercise a metal softening test at some future time, in some location over the U.S.**

*** Note this signal could also have been present for the Dec. 12 destruction of the Arrow DC-8 at Gander AFB, Newfoundland.*

On Jan. 28, 1986 the Challenger disaster occurred. The Challenger was positively killed by the Soviet Union, using the scalar EM weapons through the Woodpecker grid. A host of indicators occurred.

1. The anomalous cold weather in Florida was definitely engineered by the USSR,
2. Specialized cloud patterns associated with Soviet grid engineering and weather engineering were observed and photographed in Los Angeles, California and Huntsville, Alabama, beginning several days before the incident, and particularly on the evening before the launch,
3. The normal "pivot point" for turning the jetstream northeastward was moved south from Huntsville, Alabama to Birmingham, Alabama by the Soviets; this was to force the jetstream much further south,

and consequently move unusually cold air into the Florida panhandle, exposing the shuttle to undue cold stress,

4. About 4 hours before launch; all Soviet ships off shore suddenly left the area at speed; this was the first shuttle launch not "shadowed" by Soviet ships,
5. On the morning of the launch, higher frequencies were added to the interference grid to enable much-enhanced localization. The brains of small birds are very sensitive to these higher frequencies, due to their small diameter (wavelength) as a scalar EM receiver. If they remained in the area of localization, the birds would be in intense pain or killed. On the morning of the launch, national TV network news, announcers, noted that no birds at all were flying in the area, something which had never happened before.
6. At the time of the shuttle's destruction, a giant radial cloud pattern was actually in the general vicinity;
7. Three previous shuttle launches—the last on Nov. 26, 1985—had been used as direct test targets for tests of the Soviet launch phase ABM/antibomber defense system so the weapon was "zeroed in" on the launch site,
8. The anomalous destruction of the Arrow DC-8 on Dec. 12, 1985 had already indicated a Soviet decision to elevate the testing to the actual destruction of targeted vehicles,
9. At the time of the launch, anomalous electromagnetic phenomena occurred in nearby restaurants,
10. A metal-softening signal was on the grid, as previously detected by Golden. This signal would be detected by the launch flame, and after ignition would result in a steady weakening of the metal in and around the booster flame. Note that the metal was already cold-stressed beyond what it had been tested to withstand,
11. Almost immediately after ignition, the booster seals vented, giving evidence that the cold stress and the metal-softening signal were weakening the system,
12. An anomalous 10 second or so burnthrough of the weakened booster occurred,
13. An anomalous "light"—possibly a Soviet EM missile —was observed to play on the rocket before it blew up,
14. An anomalous "flat plate" earthquake over about 11 states occurred within days after destruction of the shuttle. This type of quake is strongly suspicious, and it was probably the test of the grid/howitzers in a ground wave interferometry mode,
15. Substantial winds and air turbulence over the launch site increased the stress on the Challenger as it rose through this region. With a giant cloud radial in the area, one strongly suspects that the turbulence may have been deliberately created or augmented by the Soviet scalar EM grid,
16. A few days later, from 1-4 February 1986, many birds inadvertently flew into the new, localized "pivot point" at Birmingham, Alabama, encountered the high frequency components, and dead birds fell from the sky in substantial numbers. Many different kinds of birds were involved.
17. Most significant of all, General Daniel Graham has reported that, on the evening after the death of the Challenger, the Soviet KGB gave a party and celebrated the success of their perfect active measures against the Challenger! Note that all development, deployment, employment, and command and control of the Soviet scalar EM weapons are under the KGB. Finally, a U.S. classified investigation of the Challenger disaster was ordered by Congress, but its results have not been made public. Beyond any doubt the Soviets destroyed the Challenger, and killed the seven brave astronauts aboard the spaceship.
18. On Apr. 18, 1985 a Titan 34-D missile, launched from Vandenberg Air Force Base, blew up 5 seconds after launch. Video cameras inadvertently caught the Soviet marker beacon, used with the scalar EM howitzer that destroyed the Titan, up and above the explosion, moving independently. Engineer Ron Cole personally examined the video frame by frame and asserted that the hovering ball of light was completely separate. This positive signature leaves no doubt that the Soviets destroyed that missile also. The previous Titan 34-D missile launch there in August, 1985 also blew up just after lift-off.

On May 3, 1986 a NASA Delta rocket carrying a critically-needed weather satellite failed. The rocket suffered an anomalous "command-type" shutdown of its main engine during launch and began to veer off course, causing the range safety officer to destroy it. On a network video tape replay (several replays in succession), immediately after the loss of the rocket, this author observed that an anomalous light moved up from beneath the rocket and struck it, seconds before the destruction. Subsequent attempts to locate that particular videotape have met with failure. Several other persons were watching the replay with me at the time, and saw the anomalous light strike the rocket. The light plus the "internal command surges" are strongly indicative of time-reversed EM pulses and interferometry from a pumped phase conjugate mirror adjunct operating with an over-the-horizon tracking mode.

Also in May, 1986 a European Ariane missile was lost shortly after launch. There is at least one published news analyst report that the French Government concluded that the Soviets had interfered with the missile and caused its loss. No further evidence is available to this author regarding this incident, except one unevaluatable report from a wealthy financier that when he visited the Soviet Union, the French President discussed that issue with Gorbachev.

In October, 1986, the *Iceland Summit conference* was held between Reagan and Gorbachev. The Soviets offered a breathtaking "zero-option" proposal, intended to lead to dismantling of most major strategic nuclear weapons, which would greatly ease the way to much more drastic employment of Soviet EM weapons. In short, if nuclear disarmament could be engineered, the U.S.'s "dead-man fuzing" against extensive employment of Soviet weapons would be almost eliminated. In that case, with its deployed, massive scalar EM weapons unleashed, the Soviet Union immediately holds the winning hand, and could rapidly proceed to dominate and control most of the earth. The Soviet offer was conditioned on the severe limitation of SDI to the laboratory, however, and Reagan balked at this.

The reason for adamant Soviet insistence that the SDI genie must not be tested in space is that, should the U.S. develop scalar EM weapons—such as high energy scalar lasers—and deploy them as SDI modifications, the power would be enormously increased. With one or two shots, such a laser could devastate a whole republic of the USSR (*Their EGPs, however would detonate nuclear warheads and nuclear facilities. The resulting fallout would devastate the earth. Such a use would be suicidal. But it would be a first-strike weapon, if a madman pulled the trigger.*)

If tested in space, prototype SDI launch and deployment vehicles would be available, even though the SDI system was not yet completed and deployed. In that case, the U.S. could possibly quickly launch several scalar EM weapons in retaliation for Soviet strikes against the U.S.—and from space even one weapon could destroy the Soviet Union. Thus, unless the SDI genie is chained up in the lab, a Soviet scalar EM initiative to dominate the world would involve unacceptable risk to the Soviet Union. At this writing, Gorbachev has mounted a great propaganda campaign to try to stimulate U.S. citizens, scientists, and political activists to demand nuclear disarmament, clearing out the U.S. dead-man fuzing.

During the spring of 1986, abnormally strong Soviet weather engineering occurred over the U. S., causing a drastic drought in the southeastern U.S. This drought was broken by a colleague who used an extremely powerful scalar EM device to redirect jetstreams. A most unusual and unique signature of the "blocking" against the Soviet scalar EM actions resulted: Two huge circulations developed in the atmosphere, clearly showed as two adjacent giant "holes" in the swirling cloud cover over the middle and eastern U.S. Between these two giant holes, the cloud circulations formed a stream of clouds, moving to the south, looking very much like a giant vertical "bar" of a huge "Y-shaped" cloud flow (*On the weather maps*).^{*} Several national weathermen commented on this unusual pattern, which had not been observed before. The pattern continued, day after day, as the blocking continued.

My colleague suffered a drastic illness and a serious operation, which interrupted the blocking operation. Immediately the jet streams changed back and serious drought returned to the southeast U.S., devastating a substantial portion of farm crops in the region. After some time, my colleague recovered sufficiently to resume blocking operations, breaking the drought and restoring the rains once again.

In latter October and early November, 1986, significant giant radial cloud patterns, associated with Soviet weather engineering using the scalar EM interference grid, were seen and photographed over California in the greater Los Angeles area. On Monday, Nov. 10, 1986 an anomalous, giant "fireball" was seen by hundreds of persons to move from west to east. It was seen over 4 states, and accompanied very sharp changes in the EM grid. An anomalous winter storm was in progress, with cold air spilling down from Canada. The storm penetrated very deeply southward, breaking cold records in a wide area of the mid-United States. At the same time, heat records were being broken in Florida, and generally throughout the southeast. Frank Golden verified by direct measurement that the electrogravitational field of the earth was agitated and most dynamic—in short, significant activity was being introduced by the Soviet scalar EM grid. (The activity was about half what it is when the Soviets are inducing an earthquake.)

On Wednesday, Nov. 12, 1986, the author photographed three giant radial cloud patterns—one a "twin"—in Huntsville, Alabama, associated with the anomalous storm, now labeled the "Siberian express" by many news reports.

On Thursday, Nov. 3, 1986 at Huntsville, the author observed another twin giant radial, gently moving along from west to east. At dusk, another single giant radial was observed at Huntsville. Also, air control radars along the corridor from Los Angeles to Arizona suffered a mysterious failure or "power outage" not long after the "meteor" incident. Reports were received from Montreal, Canada that anomalous TV interference was experienced in that area about the same time the air control radars experienced anomalous failure. This may show that the agent causing the radar failures and TV interference extended across a wide area of North America.

Note that the normal intersection of the Woodpecker beams covers such a broad area of North America in the interference zone of the beams. The so-called "*meteor*" (actually, a large, rapidly moving light was seen and noise was heard) of Nov. 10 may well have been a large scalar EM ball from the Woodpecker grid weapon transmitters, performing a simulated test of the multiple-vehicle kill mode, using a large "electromagnetic missile" created and moved by the associated scalar howitzers. Complete explanation of the operation of these systems is contained in *Fer-de-Lance* and other books and papers.

As this background summary is cutoff in mid November 1986, it does not include evidence of indications that exist for Soviet scalar EM enhancement or biological warfare against the West. The reader should be aware of the potential scalar BW threat, and the general lack of any effort to collate evidence in that area. [That area has been covered in the author's book, *AIDS: Biological Warfare*, Tesla book Co., 1988. For complete coverage, see the author's *Gravitobiology: A New Physics*, 1989.]

For the present Soviet tactic, see the author's "*Glasnost: 29th Move of a 30-Move Chess Game*," *Raum & Zeit*. in publication, and "*Political Manipulation of Unified Field Theory*," *Raum & Zeit*. in publication.

ADDITIONAL NOTES AND REFERENCES

14. For details of the mysterious explosions of six major Soviet missile ammunition storage sites in seven months, see:

- photograph, *Jane's Defence Weekly*, 2(3), July 28, 1984, p. 92;
- see also Mark Daly, "Goa and Goblet SAMs in Severomorsk explosion," *Jane's Defence Weekly*, 2(6), Aug. 18, 1984, p. 224;
- Derek Wood, "Soviets' northern fleet disabled... 'not viable' for six months," *Jane's Defence Weekly*, 2(1), July 14, 1984, p.3;
- Derek Wood, "Six explosions in the past seven months," *Jane's Defence Weekly*, 2(1), July 14, 1984, p. 3;
- John Moore, "The aftermath of Severomorsk," *Jane's Defence Weekly*, 2(6), Aug. 18, 1984, p.224.

Death of The Arrow DC-8

Soviet tests against actual U.S. targets continued over the years. In 1972 at a secret meeting in Prague of the leaders of the European Communist parties, Leonid Brezhnev confirmed that detente was a hoax (*just as Gorbachev's Glasnost is a hoax!*).

Brezhnev named 1985 as the year that the Soviets would be ready to control the skies, the oceans, and most of the land area as they might wish. In other words, all the great strategic scalar EM weapons would be completed, deployed, and operationally tested.

On December 12, 1985, Soviet "over-the-horizon radars" - with infolded Whittaker bidirectional EM wave structures to provide distance-independent holography and dispersion-free phase conjugate shooting - locked-on and destroyed a U.S. Arrow Airlines DC-8 jet aircraft at Gander International Airport, Newfoundland. In destroying the aircraft as a demonstration that the 1985 schedule had been met and the Americans were none the wiser, the Soviets killed 248 U.S. Army troops and 8 civilian crewmembers.

[See Figure 21 below]. The troops were U.S. paratroopers returning to their home station from UN peacekeeping duties in the Middle East. They were coming home for Christmas, and their parents, families, and friends were waiting for them in happy anticipation. The terrible tragedy took those happy young lives, and the lives of the fine Arrow crew - one of its best. It was not an accident, and it was not a terrorist bomb that destroyed the aircraft and killed all those young soldiers and the crew. It was a brutal, cynical, overt act of war by the Soviet Union. It was the final demonstration to Gorbachev of meeting the Soviet 1985 schedule for having these giant weapons deployed and operationally ready *and tested*. Just two weeks earlier, the weapon had been tested for the third time against a U.S. shuttle launch, but in a nondestructive manner. Some six weeks after killing the Arrow, the same weaponry would be used in a highly specialized kill of the Challenger with its crew of seven.

But here is what really happened to the Arrow DC-8 on December 12, 1985.

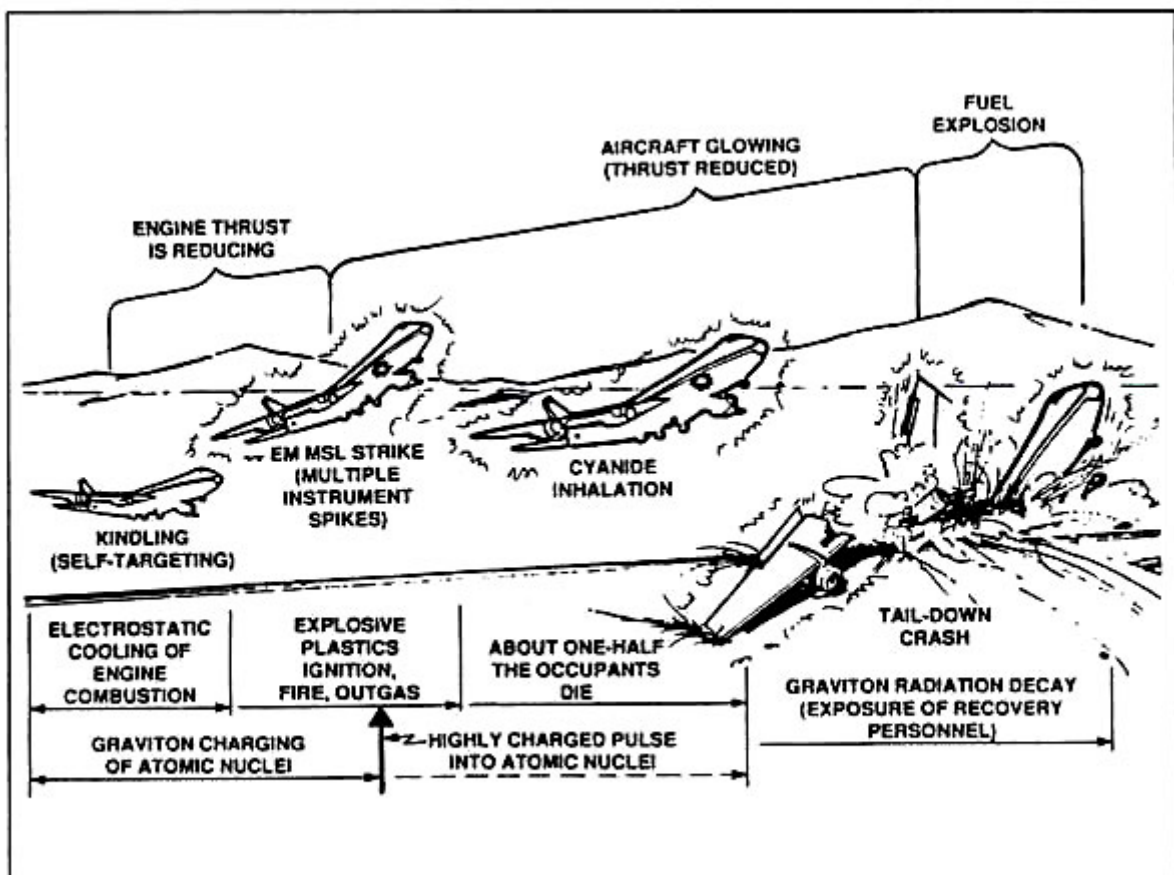


Figure 21. Death of the Arrow DC-8, December 12, 1985.

For brevity, we skip all preliminaries, and go immediately to the aircraft as it built up speed down the runway on its takeoff run. As the Arrow DC-8 aircraft sped down the runway, an eyewitness observed multiple beams of light form in the clouds overhead - in fact, she observed the self-focusing of the scalar potential beams of the interferometer. This self-focusing (self-targeting) began to cause electrostatic cooling in the aircraft

engines' combustion gases. *This is easily accomplished by properly adjusting the bias potential on the electrical ground of the distant interferometer transmitters in Russia, so that the transmitter potential is below the ambient potential of the target - the aircraft speeding down the runway in Newfoundland. If the transmitter potential is lower, a gradient exists in the scalar beam Whittaker structure joining the aircraft and the Russian transmitters, and energy will flow through the internal Whittaker structures, from hot spots on the airplane - such as the fiercely burning combustion gases - to the distant transmitter electrical ground. This will electrostatically cool the greatest hot spots - the hot combustion gases inside the engines.*

The electrostatic cooling in the combustion gases inside the engines caused them to lose exhaust gas velocity, hence reducing the engines' thrust - just at takeoff rotation. As the aircraft began to rotate for liftoff, its engines were already losing substantial thrust, *although they were still rotating at full speed.*

Once the weapon was focused, Soviets fired an electromagnetic missile directly at the aircraft, using distance-independent holography, employing the internal Whittaker EM wave structures of the scalar potential beams. The interfering sky beams flared as an electromagnetic missile formed and shot to the aircraft. *(The EM missile strike was seen by the witness as just a ball or beam of light that streaked from the glowing beams in the clouds, down to the aircraft.)* The EM missile struck the aircraft in the right side of its fuselage ahead of the engines and blasted a hole right through the fuselage. *This anomalous hole was noted. It was tested and found to have no chemical residues, proving that it was not due to a chemical explosion or a terrorist bomb. However, it was due to the strike of the EM missile!*

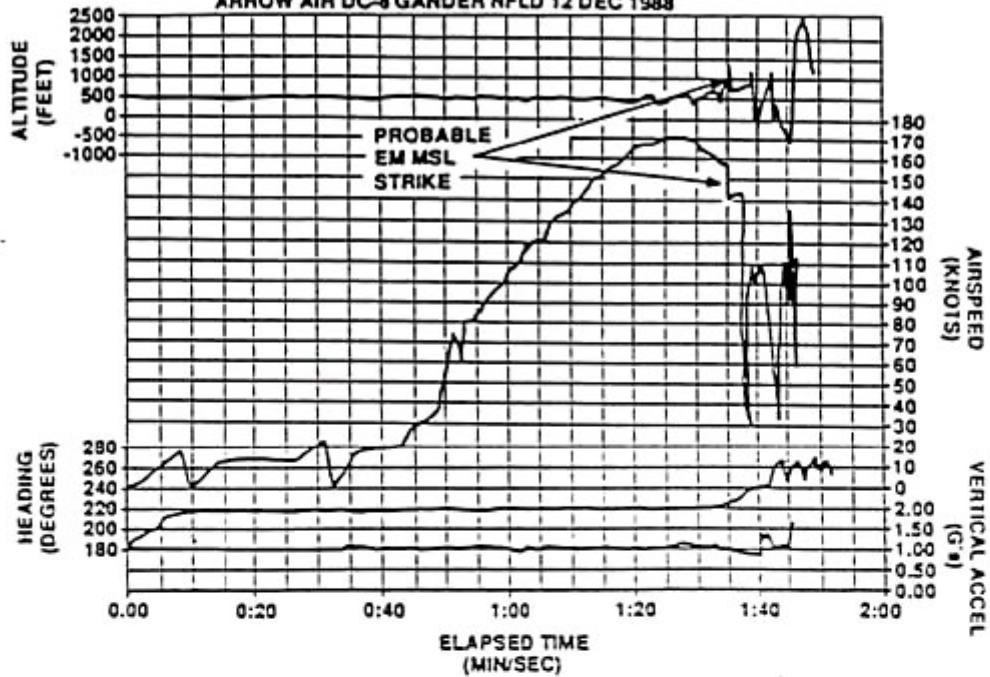
The fierce ball of EM energy penetrated the fuselage and struck the aircraft's interior plastics, explosively igniting them instantly - all just at liftoff. Multiple independent witnesses saw the aircraft glowing with an orange light, from the fierce firelight shining out the windows and the radiant energy of the locked-on interferometry beams. *Interestingly, the witness that saw the beams form in the sky, and the beam shoot down and strike the aircraft, was not allowed to present her testimony to the official board of investigation*

The flaring of the skybeams associated with the EM missile strike, and the glow on the aircraft from the electrical energy in the locked-on scalar EM beams, *brightly lit up the cabs of trucks speeding down the nearby highway.* The strike of the EM missile also caused a sharp electrical spike in two instruments on board the aircraft, as recorded by the flight recorder. *The instruments and the flight recorder actually recorded the strike of the EM missile itself* [Figure 22 below].

1ST SENSOR READINGS

FLIGHT RECORDER DATA
(ANNOTATIONS: BEARDEN 8 DEC 88)

ARROW AIR DC-8 GANDER NFLD 12 DEC 1988



2ND SENSOR READINGS

FLIGHT RECORDER DATA
(ANNOTATIONS: BEARDEN 8 DEC 88)

ARROW AIR DC-8 GANDER ... ALT FROM 2ND VG READING ... IAS 2ND RDG

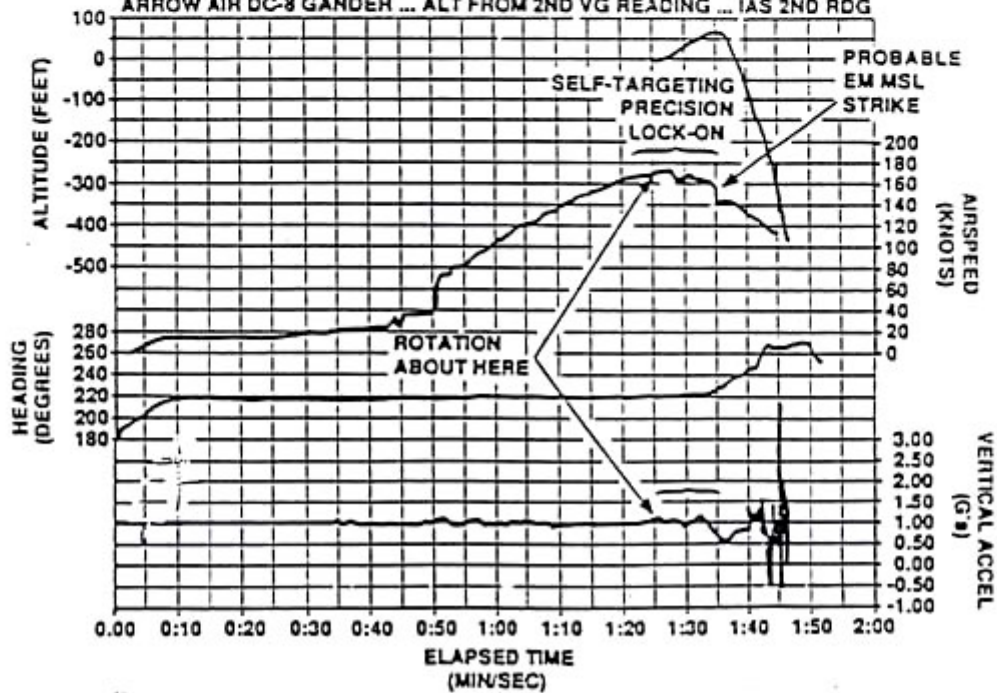


Figure 22. Electrical spikes in two on-board sensors of the Arrow DC-8, caused by strike of an EM missile during liftoff rotation.

The aircraft was glowing from the Whittaker beam structure holography and beam tracking and self-targeting. Inside the struck aircraft, in addition to the explosive fire and fierce firelight, violent outgassing from the explosive ignition of the plastics produced an explosion of soot and toxic fumes, including highly lethal hydrogen cyanide gas. With a breath or two, lethal doses of the toxic fumes were inhaled by the surrounding occupants. About half the personnel on board were already dead or dying of cyanide poisoning as the faltering plane reached its high point of less than 100 feet, still tail-down.

The U.S. Army performed autopsies on the remains of almost all the dead personnel in the crash. These autopsies indicated that almost half the personnel were already dead of hydrogen cyanide poisoning before the airplane exploded on impact with the earth. This autopsy information was illegally withheld from the official investigating board for the accident - another deliberate criminal interference with the proceedings.

But to return to the faltering Arrow DC-8. With its engine thrust steadily diminishing by electrostatic cooling of engine combustion gases, even though the turbines were rotating at good speed, the stricken aircraft sank, still tail down, and struck the ground, exploding and killing the remaining personnel on board, and scattering the burning wreckage over the crash area. *However, the sharp strike of the EM missile with its extremely powerful associated scalar EM pulse had intensely "quick-charged" and activated the atomic nuclei of aircraft materials, metals, etc in the adjacent areas of the aircraft surrounding the strike.* These Whittaker/scalar-activated (scalar-charged) nuclei were now emitting strong scalar graviton radiation. So strong scalar graviton radiation - scalar potential radiation - was issuing from the scattered parts and burning materials in the crash area. During the next few days, recovery personnel were exposed to this unsuspected scalar radiation. Many of them (about 60 or so) later developed delayed illnesses and health changes *similar to those in scalar-radiated U.S. Embassy personnel in Moscow* dizziness, headaches, nausea, stomach and intestinal upset, liver changes, blood changes, vertigo, and stress syndrome symptoms.

We accent this point most strongly. We have seen these symptoms before, in personnel radiated by the Soviets at the U.S. Embassy in Moscow. The *Johns Hopkins* study of that situation clearly shows that the active ingredient is the scalar potential, not ordinary EM force fields. We know it is scalar EM potential radiation that causes these delayed health symptoms. Further, from our study of the Kaznachev cytopathogenic effect, the Popp cellular communication system, and the Priore anticancer machine, we know the precise mechanism that causes the diseases.

The signatures of the use of the scalar EM weapon are clear. Further, additional strong evidence exists of prior 1985 nonlethal testing of the same weapon that was utilized to kill the Arrow DC-8.

Several months before the kill of the Arrow DC-8, another anomalous loss of engine power by an aircraft is interesting. In February 1985, on a flight from Taipei to Los Angeles, a China Airlines Boeing 747SP about 300 miles northwest of San Francisco was subjected to a similar but milder "self-targeting and cooling of engine combustion gases" treatment by the same Soviet weapon. [Figure 23 below].

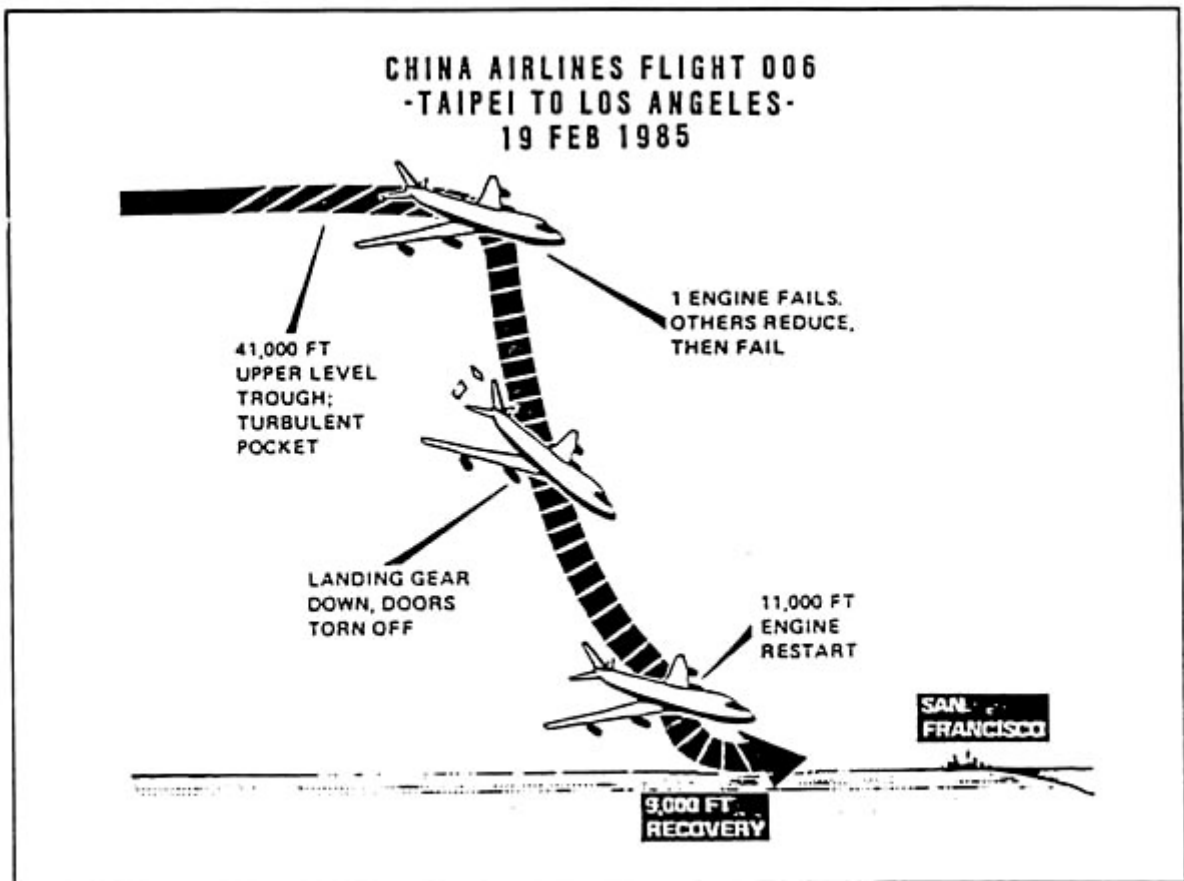


Figure 23. Engines disabled, a passenger jet drops six miles in two minutes.

At 41,000 feet the aircraft first experienced a slight turbulence - probably just when the scalar lock-on of the weapon occurred, where the emerging outfolded EM energy in the surrounding air created some slight turbulence. Then self-targeting began in the Whittaker structure of the Woodpecker standing potential wave interferometer beams. The initiation of self-targeting narrowed the interferometer onto its engine combustion gases target in the aircraft engines, causing substantial emergence of negative energy in their combustion gases. This electrostatically and drastically cooled the combustion gases, causing seriously decreased exhaust velocity, loss of engine thrust, and a special type of engine flame-snuffing. First one engine failed from the drastic cooling of its gases, and then the others failed in short order. The failures and resulting plunge of the aircraft left several signatures, however, of the anomalous mechanism causing them. *Electrical power on board the aircraft did not fail, because the engine failure was anomalous loss of thrust in fully rotating turbines due to direct electrostatic cooling of the combustion gases in the engines themselves.*

Hence the mechanically coupled electrical generators were still rotating at full speed and producing electrical power, and so the aircraft electrical system maintained power. Passenger oxygen masks did not deploy, indicating that engine *rotational* power (not *thrust!*) was always available to operate electrical and pressurization systems. In a hair-raising, uncontrolled plunge of the aircraft toward the earth, the pilot fought to restart the engines and regain control of the aircraft. The instruments reacted anomalously. The crew reported that the stick shaker did not activate and the overspeed warning clacker did not activate. Severe G-loads were experienced in the downward plummet of the aircraft, causing severe distortion of the tail cone and damage to that section.

Anomalies in the G-forces inside the aircraft also occurred. The flight engineer was totally immobilized by the g-forces at his cockpit duty station, yet the pilot and copilot directly on either side of him were unaffected. *This is a highly significant "selective gravity and selective inertia" anomaly and a clear signature of the negative energy being introduced into the aircraft by the self-targeting Whittaker beams.* As the aircraft plummeted down, it fell out of and away from the intersecting Whittaker interference beams. Apparently the distant Soviet operator deliberately did not continue to track and attack the target as it fell. Once the aircraft fell out of the EM

kindling/outfolding in the beam intersection, the scalar activation in the engines and vicinity began to decay away. Since no drastic pulse input - such as the strike of an EM missile - was employed by the Soviet weapon, scalar activation was not severely high. Thus only light-to-moderate activation of nuclei occurred, and this is a short-lived phenomenon that will decay quickly once the steady activation beams are removed. In other words, the excess scalar charge on the nuclei began to discharge by scalar emission, and the cooling of the combustion gases began to decrease steadily.

Instrumental anomalies occurred as well, since instruments interact individually to being scalarly activated. The crew reported that the cockpit instruments detected immediate autopilot disengagement; flight data recorder instruments showed that the autopilot did not disengage during the initial descent. Thus both the pilot and the autopilot conceivably were fighting to move the control surfaces during at least the initial phase of the fall. The landing gear lowered, but the pilot did not initiate the action.

After a fall of some 32,000 feet in about 2 minutes, the Whittaker/scalar EM activation was discharged sufficiently so that, with internal combustion cooling greatly diminished, the pilot managed to restart three engines and regain control of the aircraft. The crew then made an emergency landing at San Francisco International Airport. For example references, see (1) Bearden, *Fer-de-Lance*, Mar. 4, 1985, p. 175-176; (2) *Aviation Week & Space Technology*, Feb. 25, 1985, p. 28; Mar. 4, 1985, p. 29; (3) 'Jetliner drops 32,000 feet; 400 aboard; 50 are injured,' AP release, *Huntsville [Alabama] Times*, Feb. 20, 1985, p. 1; (4) 'China Airlines pilot denies cockpit error,' AP release, *Huntsville [Alabama] Times*, Feb 21, 1985, p. A-9.

But there is much additional evidence that bears directly on the scalar kill of the aircraft at Gander.

On Nov. 26, 1985, two weeks before the kill of the Arrow DC8, the same Soviet weapon was tested nondestructively against a U.S. shuttle launch at Cape Canaveral, Florida - click image below. (*This was the third nondestructive test using a launching space shuttle/booster as a convenient simulated ICBM-practice target.*)



Seconds before the launch, an offset strike of an EM missile was actually photographed by Bob Gladwin [Figure 24]. The photograph was later printed by this author [Bearden, *Fer-de-Lance*, 1986, p. 187.] Over the general launch area, another holographic ball of light - a marker beacon used by the Whittaker interferometer for precise distance-independent registration in the target area - was clearly observed by hundreds of persons and photographed by George Suchary. [Bearden, *Fer-de-Lance*, 1986, p. 182]. A similar holographic ball of

light for precise registration was also videotaped above the explosion of a Titan 34-D missile seconds after launch in April 1986; that Titan was also destroyed by the strike of an EM missile or by a very strong EM pulse through the Whittaker channel of a Soviet scalar interferometer. [See Figure 25].

In 1986 a Delta rocket was also destroyed by the range safety officer after an anomalous internal EM surge command shut down the main liquid-fueled engine, with the three strap-on boosters still burning, so that the rocket went unstable. A mysterious light streak was observed on videotape to approach the rocket from below and from the side, rising and striking the vehicle, just before the mysterious main engine shutdown. Precisely such anomalous "internal command and control switching by introduction from an external source" has been exhibited by the British Ariel VI satellite as well. Also in Spring of 1986, a French Ariane missile suffered mysterious shutdown interference, resulting in the destruction of the rocket.

In the case of the Arrow DC-8, high U.S. and Canadian officials - not knowing anything of scalar electromagnetics - were probably very afraid that the aircraft had actually been bombed by a terrorist group, possibly on behalf of the Iranians. High U.S. officials were most anxious not to reveal anything further about the Iran/Contra weapons affair and its official U.S. governmental coverup. *This probably explains why a U.S. Army General quickly arrived at the Gander crash site and brought exceedingly strong pressure to bear to quickly bulldoze over the crash residue. It also probably explains why most eyewitness testimonies that contradicted the - probably deliberately selected - "ice buildup" - cover story were withheld from the accident investigation board, and why the board was not permitted open access to the files and witnesses!* This unprecedented action, of course, is tantamount to deliberately withholding evidence from a court and interfering with a court trial - a criminal offense. High U.S. officials would have been most anxious to keep from revealing any sign of onboard fire or explosion, since - if the crash *had* been due to a terrorist bomb - this might fully open up the investigation and drive it sufficiently far afield to reveal the Iran/Contra coverup by the U.S. government.

So in addition to the wanton Soviet act of war and murder of the troops and crew aboard the Arrow DC-8 aircraft, a gross miscarriage of justice occurred due to:

- (1) technical ignorance of scalar electromagnetics and of signatures of the strike of a scalar EM weapon
- (2) deliberate high-placed collusion and manipulation
- (3) probable mistaken off-the-record belief by high U.S. officials that the crash was really caused by a bomb planted by a terrorist group backed by Iran

By rather gross manipulation of the investigation, of the files, and of the board itself, the "accident" was officially blamed on human error due to failure to de-ice the aircraft. The members of the board split in their finding, however, and a minority opinion was also produced, denying the ice theory.

Families of the deceased U.S. soldiers have demanded a thorough reinvestigation. This researcher stands ready to open his files to the investigating board, a Congressional investigating committee, or any special board investigating the "accident". I will gladly provide substantial briefings regarding the complete history of Soviet scalar EM weapons and their testing, the precise mechanisms and signatures of scalar EM weapon strikes and kills, and specific indicators in the Arrow DC-8 crash incident that remove any doubt as to what actually caused the crash. There the matter stands.

The Unsuspected Deadly Nature of... Internal EM Pollution

In addition to the "externalized energy balance" of nature, there is a heretofore unsuspected (by *Western reductionists*) internal energy balance of nature. This internal energy balance is of vital importance when we consider how the planet is being polluted.

The most deadly pollution of this planet is the steady and increasing pollution of the internal "rivers of life" inside the biological potentials of the planet and all its living systems. That is, we are steadily polluting the very intercommunication and intracommunication fields that sustain life as we know it. In short, we are slowly killing the living mechanism in and on this biosphere. We are slowly sickening unto death, and no one even knows it.

Environmental and ecological issues cannot be adequately discussed and completely dealt with until our science develops a sufficient knowledge of internalized EM energy, its exchanges within the environment, and the overall internalized energy balance of nature and of our biosphere.

The importance of electronic smog—of the vast and increasing multitude of individual signals that now fill our environment—cannot be overemphasized, nor can its future impact. This smog is slowly producing an artificial quantum potential on earth, one that has a most deadly and lethal "jamming noise" structure, and steadily contaminating the natural quantum potentials and bioquantum-potentials that are our heritage. This pollution even includes the internal pollution of the tri-system: the coupled Sun, Earth, and Moon. We are slowly poisoning the life mechanisms in this entire region of the solar system. As we charge-up the Earth's potential, that charge is diffused to both Sun and Moon through the hidden internal communicative bidirectional EM Whittaker structures. We are not only slowly extinguishing ourselves, but also the Triad system.

In biological systems the presence and effects of the increasing jamming of our living energy flows will be evidenced by anomalous effects, often by very slow effects for which we do not recognize a causal connection. Long-range detrimental effects from this smog are occurring now, such as extremely slow jamming of our immune systems, leading to a rise in arthritic diseases, immuno-suppressive opportunistic infections, etc. Also, such diseases as influenzas will slowly seem to become harsher and harsher. Indeed, new strains will appear, and they will be much harsher and more resistant to medical treatment. Continually stimulated, the immune system slowly begins to improperly react in and upon the body, and so the auto-immune reactions increase slowly, year by year. Leukemia— cancer (control disorder) of the blood—is increasing, as are other cancers. The sperm count of young American males has already decreased by up to 50 percent.

The real problem behind the puzzling and anomalous effects of video screen emissions that computer operators are exposed to is the fact that each electron striking the screen comes to an extremely abrupt halt, creating a very sharp individual EM potential gradient signal change, with very high frequency components. Added to the other frequency components in the tube—such as due to scanning of the beam, internal circuit operations, magnetic focusing, etc.—this means that the electrostatic potential emanating from the face of the tube is filled with a conditioned Whittaker structure from all the electronic hash inside the computer, tube, and screen. This structure has a very harsh micro-microstructure of hidden sharp signals from the rather instantaneous stoppages of electrons on the screen. This is a "Whittaker hash", and its effects continually diffuse into the vision center, brain, and nervous system of the operator.

The light from the tube is conditioned with this Whittaker structure, and when absorbed by the retinas of the eyes, it imparts and diffuses that hidden structure directly onto the nervous system and the surface of the brain. By diffusive activation (charging), this gradually spreads into the other parts of the body, particularly in and through the master cellular control system, and partially charges their potentials with the hash. After hours of exposure, kindling of the Whittaker structure in the physical system is sufficient to be expressed as physical changes such as headaches, vision effects, dizziness, etc. Very subtle blood tests should also reveal blood changes, particularly typical of weak auto-immune reactions, or typical of weak stimulation of the immune system.

The more subtle parts of the master control system are affected as well. With repeated and daily exposures, the "hash activation" partial charge is sustained in the body, continually interfering with precise control mechanisms. Thus an increased incidence of fetus defects, responsive abortions by the body, and birth defects in infants of exposed pregnant women has a causative basis.

In a radar system, there is "splatter" and noise from all the various circuits, the transmitter, and reflections in the area. Harmonics, reflections from surrounding plates, panels and objects, and the continual interference of all these signals, form a Whittaker potential with a sharpened and dynamic "hash" for its internal structure. This hash continually diffuses into radar operators and maintenance personnel exposed to it. Diffusion of the jamming "hash" leads to slow, harmful variations in the master cellular control systems of the exposed personnel. Defective sperm cells can result. A higher incidence of cancer and leukemia results in operators extensively exposed to such "non-ionizing radiation" in their everyday duties.

Powerlines act as antennas, continually picking up and re-radiating all the electronic signals that impinge upon it, no matter how weak. Myriads of television, radio, power machinery, and other electrical/electronic signals are involved. Further, the power flowing through the line carries all the electronic smog from any place along it to all the others (time-reversed components of the infolded Whittaker structure considered.) So it is a vast gatherer of electronic smog, which is infolded inside its potential and re-radiated everywhere along its length. With the criss-crossing of numerous new lines every year, and the drastic increase in communications signals, electronics signals, and electrical signals, we are slowly poisoning our entire biospheric living internal river of life. We are steadily contaminating and poisoning the entire planetary potential, and each and every year we are dramatically increasing this deadly effect.

In the modern home and office, we are particularly "blessed" with these interactions. Numerous electrical and electronic gadgets whirl and operate and create EM fields and weak EM radiation signals. The electrical powerline brings to our home all the internal patterns that have been impressed from afar; literally it brings us weak electronic hash from the entire earth. The light from our electric lights and lamps carries this hash directly into our retinas, brains, and nervous systems. The Whittaker structures are modulated into the sound from our radios and stereos, entering our ears and auditory systems, on into our nervous systems and brains. Watching television, the light from the tube contains all this hash and also the internal hash of its own circuits, tube, and its screen hash.

Continual weak EM hash continually impinges on our skin by radiation from light sockets, appliances, and fixtures. If we sleep under an electric blanket, we sleep directly in an alternating magnetic field that penetrates even down to the nuclei of the atoms of our body, directly inputting the hash into our body's biopotentials. Even when turned off the fixtures and appliances in our home continue to emit Whittaker standing potential waves, exposing us to weak but continual hash. Thus the same cellular changes, etc. that occur in video screen operators and radar operators begin to gradually occur in our bodies, from the EM pollution of our environment. Usually, however, we get a smaller "dosage rate" than the screen operator or radar operator, and so the changes occur more gradually. Our unhealthy EM hash environment is already inducing leukemia and cancer, and immune system defects and diseases, gradually over a period of years.

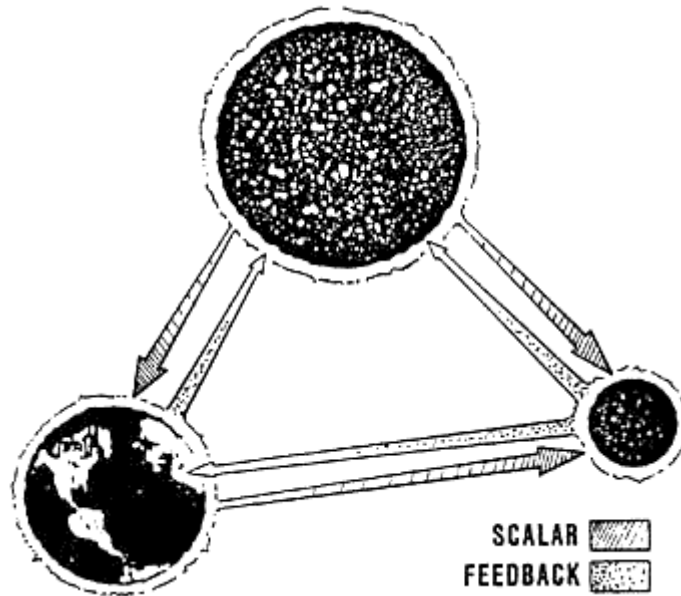
"Hot spots" will obviously occur, where the dosage rate is increased because of particular reflections, reinforcements, interferences, etc. Such cancer and leukemia hotspots do indeed exist, without any presently known explanation.

In the "normal" weak EM noise environment that used to exist on earth, the minimum threshold effect provided security against the normal weaker background. The maximum threshold effect provided security against sudden larger "EM jamming" occurrences. In today's EM noise environment, both of these protection thresholds are becoming inadequate.

Mechanisms For Evolution, Gaia, and Morphogenetic Field

For all the creatures and species on earth, the Whittaker structured potential mechanism provides the precise physical mechanisms for evolution, and for Sheldrake's morphogenetic field.

Every creature continually contributes structures into the quantum potential for its own species, and the quantum potential for every species is part of the overall planetary quantum potential for all its living things.



Each species has its own quantum potential, to which every action, movement, thought, or incident of, by, and to its members contributes a minute amount of substructuring. Thus very, very slowly the species bio-quantum-potential adapts from the combined experiences of all its members, and the species "learns." Sudden wholesale changes, of course, can extinguish a species before this mechanism has time to adapt. But if the species has time, it will adapt to even harsh changes inflicted by its environment, and it will change and survive. The species bio-quantum-potential provides the exact mechanism for the species to change, adapt, and evolve to survive the slowly changing adversities of its environment.

It should specifically be noted that potentials organize into entire hierarchies of organization. That is, a potential is normally a conglomerate composed of many smaller potentials, each of unique Whittaker structure. The stress of a potential is rather analogous to the pressure in a mixture of gases; the overall pressure of the gaseous mixture is composed of partial pressures of the various gaseous components. Each gaseous component has its own individual contribution to the overall pressure of the entire gaseous mix.

In the case of the potential, the overall Whittaker structure of a particular potential is comprised of the overall Whittaker structures of its component potentials.

The point is, a quantum potential of one entity is composed of the partial quantum potentials of its component entities.

Note that each living cell of a biological organism is itself a complete biological organism. Each cell has its own individual bio-quantum-potential. Insofar as that cell is concerned, its "species" bio-quantum potential (BQP) is the body bio-quantum-potential of the whole animal of which the cell is a part. (Even organs of an animal have their own biopotentials, as does every physical structure and division of everything in the universe. And everything intracommunicates and intercommunicates via hidden EM energy.)

Successively deeper Whittaker potentials are nested inside the bio-quantum-potential for the cell, one for each next smaller level of interior structure. The end result is that this cellular hierarchical structure continues directly down into and onto the nucleus of each atom composing that structure. This is the manner in which the life of a living system is attached to, and activates, the physical matter of its body. We have thus specified precisely what the living-spirit of a body is.

Communication between all living levels continually occurs via the mechanisms contained in the two Whittaker papers (W-1903: infolding external EM at one level into internal EM at the next lower level; and W-1904: unfolding EM at one internal level to the next outer externalized level). Thus in a true sense, all life on the planet is completely intercommunicative and intracommunicative. Literally, the planet is a living being, and a special kind of Gaia exists.

Particularly strong *Whittaker-structuring communication* occurs between an individual member of a species and its species bio-quantum-potential at fertilization/conception and at death. Thus at cell division (formation of a new cell), mitogenetic radiation is more strongly emitted, showing that increased communication has occurred in

a (relatively) impulsive manner. The recorded experience of the body is communicated to the new cell at this time. At the death of the cell, again mitogenetic radiation is more strongly emitted, showing that again impulsive communication has occurred. The recorded experience of the cell—particularly its most recent experiences—are impulsively transmitted at this time, from the unfolding Whittaker structures of its bio-potential.

Similarly, at the fertilization of an egg and the conception of an animal, biocommunication is impulsively exchanged between the newly conceived entity, the body of its mother, and the species bio-quantum-potential. At the death of the individual animal, a relatively impulsive communication again occurs between the cells of the dying body, the dying organism, and the animal's species bio-quantum-potential.

Thus it can be seen that the adaptation or evolution of a species is subject to both slow communication components and various impulsive communication components. The development of the bodily form of the members of a species thus can undergo jumps from greater "impulsive discharges" rather than just slow gradual change. That is, obviously a reptile species could not gradually develop a wing by small degrees. Instead, to develop a wing, the wing must appear at once. This can occur under heavy, sustained pressure on the species, stimulating and building a specific phase conjugate portion of the bio-quantum-potential (BQP) of the species. In the ghost forms existing in the vacuum potential, the form for that wing definitely exists, as does the ghost form for anything else that can be imagined. Intercommunication between the atomic nuclei of the living organism and the vacuum potential continually and strongly occurs; there is a violent flux exchange at all times between these nuclei and the vacuum.

The external experiences being impulsively communicated back to the atomic nuclei from the species and its members thus continually diffuses on out into the surrounding vacuum potential. The surrounding vacuum potential's Whittaker structuring is continually activated by the Whittaker-structuring of the overall bio-potential of the individual animal. Thus we have specified the specific mechanism for, and the form of, the long-sought "aura" of the living animal or person. That aura is quite real, and it does exist. Further, knowing what it is, we can now develop instruments to detect and record it, including systems to analyze its contents. Let it be strongly pointed out here that we are talking physics, *not mysticism*

On the other hand, we are most certainly not talking the present rank scientific materialism. To state it in more theological terms, man is truly made in the image of his creator. And the image of the creator is the quantum potential of the vacuum. Further, Man—as is every other living thing created by the Creator—is always and forever in direct but hidden communication with the image of his Creator. It is that image mechanism and its adaptive intervention that is the cause of all evolution. The Creator indeed made man—and everything else—out of the dust of the earth. And indeed he activated his creation with the "breath of life." The new physics does not dispose of *God*; to the contrary, it marvelously and non-dogmatically — and scientifically — reveals his ubiquitous presence and his ubiquitous hidden intervention.

In so doing, the new physics also does away with the present scientific nonsense of dogmatic scientific materialism. We are not robots and machines; we are living souls. Our minds and our beings are not captured in the puny electrical discharges of our brains and nervous system, but in marvelous structures pervading the entire universe, everywhere, everywhen, in the internal Whittaker structure of every point in space-time. Each has a spirit (that which motivates matter), and that spirit is a form in the Whittaker-structures of all the potentials of the universe. Further, the spirit is eternal. Destruction of the physical body does not alter the fact that the individual spiritual form and its every deed, thought, feeling, and experience exists for all eternity, in every part of the universe, directly in the form and image-potential of *God*. We indeed are eternal, and our true self is nonmaterial and immortal.

The shabby treatment of our present scientific orthodoxy in attempting to deny us our spiritual heritage is refuted, and this refutation is scientifically testable. We challenge the present dogmatism to practice scientific method and put it to legitimate experimental test. Spend some money and some time, and do it right. The necessary instruments can be developed. The necessary tests can be performed. The necessary results can be shown. And, given those results, the present materialism must be cast aside as an infantile derangement. It is long past the time when science should put away such juvenile things, and get on with a more mature, adult world. If it does this, then science can contribute to the salvation of Man. If it does not do it, it will continue to contribute to the destruction of Man.

We show now the causative mechanism for adaptive evolution.

In the gravitons composing the vacuum potential, one photonic element is "time forward" and one is "time-

reversed." These are phase conjugates. Thus, any pattern consistently happening to the species diffuses into the vacuum potential, where its opposite or "negative feedback" component is automatically selected/created by phase conjugation.

The bottom line is this: the external factors causing stress on a species automatically (but slowly) generate a time-reversed response in the activation of the vacuum potential. That is, the species' need-charge generates an activated phase conjugate response-charge, effectively charging up (integrating) the very ghost form or forms in the virtual state of the vacuum that would fulfill that need.

As is well-known in physics, a virtual entity can become real and observable if energy is added to it. Thus the species-need is steadily causing just such "addition of energy" to the virtual state ghost form that answers that need. When sufficient energy has been added (when it has been sufficiently charged/activated), the ghost form starts emerging into the observable state, in the conceptions (via impulsive discharge) taking place in the species. Then species members start being born with that evolutionary change already fully established

This is the specific mechanism for evolution of the species. It explains not only slow adaptation, but also impulsive adaptation. It explains why evolution/adaptation occurs in jumps rather than in continuous changes. And it also explains why, in desperate circumstances when sufficient time still is available, rather drastic jumps can occur.

Extracting Electromagnetic Energy From The Vacuum

Abstract

Generators and batteries do not furnish any of their internal energy to their external circuit, but only dissipate it internally to perform work on their own internal charges to form a source dipole. Once formed, the dipole's broken symmetry extracts observable energy from the virtual particle exchange between dipole charges and active vacuum. The extracted observable energy is reradiated as the energy flow through all space surrounding the external circuit. The tiny Poynting fraction intercepted by the surface charges enters the circuit to power it, while the huge non-intercepted Heaviside fraction misses the circuit and is wasted. So electrical loads are powered by energy extracted from the vacuum, not by chemical energy in the battery or shaft energy input to the generator.

Any EM system may be asymmetrically regauged freely, changing the energy of the system by changing its potential. By placing the source dipole in a closed current loop with external loads and losses, half the free excitation energy then discharged by the circuit destroys the source dipole while half powers loads and losses. This applies *Lorentz symmetrical regauging* so that additional internal generator/battery energy must be made available to dissipate on the internal charges to reform the dipole. Such self-crippling EM power systems exhibit $COP < 1.0$ a priori. Requirements for $COP > 1.0$ EM systems are given, as are recognized examples of such processes. We also propose the ubiquitous unaccounted Heaviside energy as the "dark matter" gravitational energy long sought by astrophysicists.

Introduction

A permanent solution to the world energy problem, dramatic reduction of biospheric hydrocarbon combustion pollution, and cessation of building nuclear power plants (whose nuclear component is used only as a heater) could be readily accomplished by the scientific community. However, to solve the energy problem we must,

- (i) update the century-old notions in electrodynamic theory of how an electrical circuit is powered
- (ii) rid the classical electrodynamics model of numerous serious foundations flaws

We summarize the problems and essential changes, based on more modern developments in particle physics and gauge theory well after the foundations of electrodynamics were set. Self-powering systems readily

extracting electrical energy from the vacuum to power themselves and their loads can be quickly developed whenever the scientific community will permit their development to be funded.

What Actually Powers the External Circuit Connected to a Battery or Generator?

Contrary to conventional wisdom, neither the shaft energy introduced into a generator nor the chemical energy present in a battery is used to power the external circuit. The internal energy in a generator or battery is only dissipated to perform work upon the internal charges, to separate them and form a source dipole between the terminals, with some of the energy dissipated in other internal losses.

Once formed, the source dipole's broken symmetry^[1] in the vacuum's energy flux extracts enormous observable EM energy — many orders of magnitude greater than the small amount of energy input to the generator or present in the battery — from the virtual particle exchange between dipole charges and active vacuum. The extracted observable EM energy is reradiated as the EM energy flow through all space surrounding the external circuit^[2]. This energy flow is usually referred to as the Poynting^[5] flow, but Poynting's theory^[3] captured only a very tiny component of it. Heaviside captured the remaining huge component, but Lorentz^[6] mathematically discarded it.

To summarize: The total energy flow in space surrounding the conductors has two components as follows:

- 1) A tiny Poynting component^[3] of the energy flow directly along the surface of the conductors strikes the surface charges^[4] and is diverged (deviated) into the conductors to power the circuit.
- 2) The huge non-diverted Heaviside component^[5] filling all space around the circuit, misses the circuit entirely and is wasted in all those circuits using only a single pass of the energy flow. The Heaviside energy flow can furnish energy to the circuit if retroreflected to again pass over the surface charges, but conventional power systems completely ignore this enormous energy source accompanying every circuit. Other methods of extracting energy from the neglected Heaviside component are discussed later.

Why Lorentz Eliminated the Heaviside Flow Component

The Heaviside component was arbitrarily discarded by H.A. Lorentz^[6], who integrated the energy flow vector itself around a closed surface enclosing any volumetric element of interest. This discards any nondiverted (nondiverged) energy flow components, regardless of how large^[7], and retains only the diverted (diverged) component. Effectively Lorentz arbitrarily changed the energy flow vector into its diverted flow component vector — a fundamental non sequitur. In one stroke he discarded the *bothersome Heaviside component*, reasoning that it was "physically insignificant" because — in single pass circuits — it does not enter the circuit and power it. This is rather like arguing that all the wind on the ocean that does not strike the sails of a single sailboat, is "physically insignificant." A moment's reflection shows that the "insignificant" remaining wind can power a large number of additional sailing vessels. A very large amount of energy can be extracted and used to do work, if that "*physically insignificant*" wind is intercepted by additional sails^{[8][63]}.

If Lorentz had not arbitrarily discarded the huge Heaviside energy flow component surrounding the circuit and not contributing to its power, electrodynamicists would have been confronted with the dilemma of explaining where such an enormous flow of energy — pouring forth out of the terminals of every generator and battery — could possibly have come from. Obviously the operator does not input such enormous energy, because the Heaviside flow is often some 10¹³ times as large in magnitude^[9] as is the retained *Poynting flow*. Neither does a battery contain such enormous chemical energy.

The Deadly Closed Current Loop Circuit

In conventional systems, a closed current loop contains the generator or battery source dipole as well as the external circuit's loads and losses. This arrangement requires that half the collected energy in the circuit must forcibly pump spent electrons in the ground return line back through the back EMF of the source dipole. Specifically, for every electron passing through the voltage drop across the loads and losses in the external circuit, an electron must be forcibly rammed back up through the source dipole against the same voltage.

Forcing the spent electrons through the source dipole's back EMF performs work upon the end charges of the dipole to forcibly scatter them. This destroys the dipole and cuts off its free extraction of energy from the vacuum. In a charged battery, this "back EMF work" causes a partial reversal of the normal chemistry^[10] of the electrolyte, which reduces the chemical energy available by the battery to re-establish the source dipole. The

battery's remaining chemical energy is expended to continually restore the source dipole as it is continually destroyed, until the chemical energy is exhausted. Then one must introduce additional energy into the battery to "recharge" it by forcing the chemistry back to its initial fully charged condition.

Electrical loads are and always have been powered by energy extracted and converted from the vacuum by the source dipole, not by shaft energy furnished to the generator or by the chemical energy in the battery. Half the Poynting energy collected in the external circuit is expended in the circuit loads and losses (forward EMF direction), and half is expended against the back EMF of the source dipole (in the back EMF direction), destroying the dipole.

Another way of seeing this is to simply examine the scalar potential existing between the two charges of a dipole. A "scalar" potential is not really a *scalar entity*, although it has a scalar reaction cross section for reaction with a static charge. Instead, it is a harmonic set of bidirectional longitudinal EM wavepairs, as shown by E.T. Whittaker^[37] in 1903. Thus any dipole has:

- an enormous set of longitudinal EM wave energy flows into it from every point in the universe
- and a corresponding enormous set of longitudinal EM wave energy flows out from it to every point in the universe

Once the source dipole is formed in the generator or battery, this energy flow exchange between source dipole and the universal active vacuum is established and ongoing, as is the broken symmetry of the dipole in that energy flux exchange with the active vacuum. At any point in the universe in that "potential" (organized bidirectional flow), a charge will interact with the flow and extract energy from it.

Present Power Systems Are Designed to Forcibly Apply Lorentz Self-Regauging

Together the two equal halves of a conventional circuit's energy dissipation constitute forced Lorentz symmetrical self-regauging^[11] of the discharge of the excitation energy. In turn, this causes the excited system to forcibly maintain its equilibrium with its active vacuum environment while dissipating excitation energy in the circuit loads and losses. *Classical thermodynamics* with its infamous second law rigorously applies, because the system itself is diabolically designed to continuously and forcibly restore itself into equilibrium with its active vacuum environment by killing its own source dipole gusher of vacuum energy flow.

A priori the source dipole is killed faster than the load is powered, since half the circuit's excitation energy is discharged to destroy the dipole, while less than the remaining half of the circuit's excitation energy is discharged to power the load.

In a generator-powered system, continual input of energy to the generator shaft is required to continually add energy to perform work on the scattered charges, in order to restore the source dipole which the closed current loop continually destroys. Thus our present self-crippling vacuum-powered generator circuits/systems exhibit $COP < 1.0$ *a priori*, as do our self-crippling battery-powered circuits and systems.

We must pay for the initial energy input to the generator to establish the source dipole. Once formed, the dipole continuously extracts and pours out enormous observable EM energy flow from the vacuum. The typical closed current loop circuit receives only a single-pass of the energy flow, and therefore only intercepts, collects, and utilizes the very small Poynting component, simply wasting the enormous Heaviside component that misses the circuit altogether. Our present single-pass power systems waste some 10¹³ times as much energy as they catch and utilize. Scientists can easily do better than this if they,

- (i) remove Lorentz's arbitrary and erroneous discarding of the Heaviside energy flow
- (ii) develop circuits and circuit functions to catch and use much of that available but presently neglected huge energy flow

To summarize:

The intercepted Poynting energy flow component freely "excites" the external circuit, which then will decay from its excited state and release its excitation energy back to its vacuum environment. Due to the design of the closed current loop circuit, that decay is self-enforced to be a symmetrical regauging of the system back to a non-excited state. In present closed current loop circuits, half the Poynting excitation energy is still used in this symmetrical decay to destroy the source dipole.

The other half of the Poynting excitation energy is used to power the load and losses, so that only a part of that half is dissipated in the load. A real circuit has losses, so less energy is dissipated in the load than is dissipated

to kill the dipole. Since it requires at least as much energy to re-create the dipole as to destroy it, then the energy continually dissipated in the load is less than the energy we have to continuously input to the shaft of the generator to re-create the dipole. For real systems, with such a self-defeating circuit design we cannot obtain as much work in the load as the energy we have to input to keep restoring the dipole that our circuit diabolically keeps killing. So conventional circuits exhibit $COP < 1.0$.

What We Mostly Pay the Power Company To Do

Essentially we pay the power company to engage in a giant Sumo wrestling match inside its generators and to lose by killing the free extraction of energy from the vacuum faster than the wrestling process powers the loads.

We pay the power company to use only a "single pass" of the energy flow along its transmission lines and the consumer power circuits, and thereby to just "waste" some 10¹³ times as much available EM energy as the company allows us to "use".

Present electrical power systems simply repeat this travesty over and over, so that we are continually inputting external energy to the generator to restore the source dipole, and having to input more than we get back out as work in the load. That is why all conventional EM power systems exhibit $COP < 1.0$ a priori. The system is specifically designed to force itself to do precisely that, by killing itself faster than it powers its load.

Such an inane power system continually forms a marvelous extractor of vacuum energy, then turns upon itself suicidally. In an oil derrick analogy, the system continually destroys its own energy flow "well head" (source dipole) and does not capitalize upon it. That is rather like drilling an oil well, bringing in a great gusher, catching a little oil in barrels, burning half of the barreled oil to deliberately cap the well, then drilling another well beside the first one, forcibly recapping the second one, and so on.

This is what keeps those coal trains running, the fleets of oil tankers steaming, the natural gas lines flowing with gas and the oil pipe lines flowing with oil, and gasoline and diesel engines powering our transport. It keeps enormously expensive nuclear power plants being built so that their nuclear reactors can produce heat to boil water to make steam to run turbines to input shaft power to the electrical generators for the generators to restore their continually-killed source dipoles.

This insanity keeps our energy costs high, economically burdens every citizen and every nation, impoverishes many undeveloped and developing nations along with their peoples, and pollutes the planet to the limit of its tolerance and beyond.

On our present course, we are embarked upon destroying our biosphere and ourselves along with it. Eerily, our scientific community ignores the terrible 135-year-old foundations errors in classical electromagnetics and assures us that this is the best that electrodynamics can do. In fact, the *scientific community* has not yet even recognized the problem, much less the solution. Heartbreakingly, the community itself seems adamantly bent on defending gross non sequiturs, dogma, and the status quo, rather than correcting an aged discipline so seriously flawed that it has become a scientific disgrace.

Requirements for Maxwellian EM Power Systems Exhibiting $COP > 1.0$

Along with some suggestions, the characteristics for permissible electrical power systems that exhibit $COP > 1.0$ are:

1) The system must be an open thermodynamic system far from equilibrium in its energetic exchange with the active vacuum. In that case classical equilibrium thermodynamics does not apply, and such a system is permitted to:

- (i) self-order
- (ii) self-oscillate or self-rotate
- (iii) power itself and its loads simultaneously (the energy is just taken from the vacuum)
- (iv) exhibit negentropy

2) The external circuit's loads and losses must not be completely coupled into the same closed current loop with the source dipole in the generator. One suggestion is to develop and use proven energy shuttling in circuits. This discovery by Tesla^[12] can only be seen (and designed) by electrodynamics theory embedded in an algebra

of higher topology than tensors ^[13], ^[14].

3) The system must iteratively collect additional energy from the available but normally wasted enormous Heaviside energy flow component.

a) A primary way to do this is to iteratively retroreflect the non-diverted Heaviside energy flow component after each pass, reflecting it back and forth across the surface charges in the circuit's conductors, collecting additional EM energy in the circuit on each repass.

b) A second avenue is to intensively re-investigate and develop Kron's ^[8, 63] discovery of the "open path" for EM networks as a dual of the conventional closed path.

c) A third suggestion is to further investigate and develop (in higher topology algebra) Tesla's energy-shuttling in EM circuits as shown and improved by Barrett ^[13, 14]

d) A fourth suggestion is to utilize intensely scattering optically active media (ISOAM) and develop self-excitation processes in the medium. With output in the infrared region, such a process could use the excess heat to provide the heater portion of conventional power plants, allowing relatively straightforward phase-in of clean vacuum energy powering of most present major power systems. Previous experiments with such ISOAM have utilized external excitation of the medium and thus have COP < 1.0. However, self-excitation looms in the mechanisms being uncovered in the most recent experiments ^[15], which have shown positive feedback loops, trapping of light flow energy in large random walks of over 1,000 individual interactions, weak Anderson-type localization, and constructive interference of forward time and reversed time light paths. These recent experiments point toward a potential "vacuum-energy-powered heater." With additional research, such a heater can become self-powering by the presence of sufficient positive feedback (which will allow excess collection from the Heaviside energy flow component). We have pointed out ^[16] that this ISOAM process — with the self-excitation occurring spontaneously as a "kick-in" process in an exploding gas — probably accounts for the phenomena observed in the gamma ray burster. Re-ignition, afterglow, and similar effects are observed in both the gamma ray burster and also in the latest ISOAM experiments. Similar phenomena occur in x-ray bursters as well, and perhaps even in the recently confirmed gamma ray emissions from intense storm clouds.

e) A fifth suggestion is to reopen the intensive investigation of true negative resistors such as those by Kron ^[8, 63] and Chung ^[29], adding the consideration of vacuum energy interaction into the electrodynamics utilized for the investigation. Indeed, the original point-contact transistor often behaved in true negative resistor fashion, but was never understood ^[17]. The point-contact transistor was simply bypassed by advancing to other transistor types more easily manufactured and with less manufacturing variances.

f) As a sixth suggestion, we point out that all semiconductor materials are also optically active materials, and that a point discharge into such materials represents a very sharp regauging discharge due to the increase in potential at the tip. This means that the junction involves asymmetrical self-regauging, iterative time-reversal retroreflection, increased Poynting and Heaviside energy flow components, optical scattering processes inside the junction materials, etc.

g) As a seventh suggestion, intense sudden discharges in ionized gases are especially of interest due to the presence of optical frequency components and the involvement of iterative optical retroreflection etc. These processes seem to be involved in several investigations and inventions ^[18].

h) As an eighth possibility, the present author ^[19] has advanced an engineerable mechanism — still proprietary at this time — for altering the rate of flow of a mass particle (or a set of them, comprising a mass) through time, including time-reversing the particle back to a previous state. The mechanism provides for exciting and discharging a charge with a time-charge excitation, where time-charge (time-energy) is ordinary spatial energy compressed by the factor c^2 . Hence time-charge (time-energy excitation) has equal energy density to mass. In a small time-reversal zone (TRZ) created by the process, like electrical charges attract and unlike electrical charges repel. We believe this process or a similar one may be involved in the intense clusters of like charges demonstrated by Shoulders ^[20] and in cold fusion reactions. The law of attraction and repulsion of charges is reversed in a TRZ, but the TRZ then decays away, providing an entirely new class of "inside-to-outside" nuclear interactions not achievable by present "outside to inside" collision physics at low spatial EM energy. As the TRZ decays, energetic changes are initiated which start from every point in space-time inside the TRZ — including inside nucleons located in the zone — and move outward, interacting first with the nearly-time-reversed quarks and gluons so that quark-flipping and change of proton to neutron and vice versa become favored reactions. In the highly localized TRZ the quarks are nearly unglued anyway, so that alteration of quarks is not formidable.

We have proposed novel new reactions ^[19] which produce most of the observed low energy transmutations of the electrolyte experiments, and also explain the anomalous phenomena experienced in the instruments for several years in electrolyte experiments at China lake. In addition to a vast new set of highly localized nuclear reactions of extremely high time-energy but extremely low spatial energy, the TRZ mechanism would seem to allow the production of true negative resistors — e.g., to be used as an external circuit bypass shunt around the source dipole in the generator, transformer, or battery. If so, once the process is developed and shown to be valid, EM circuits exhibiting COP > 1.0 will hopefully become a standard development, as will direct engineering of the atomic nucleus and nucleons in that nucleus.

i) As a ninth mechanism, application by Kawai ^[21] of adroit self-switching of the magnetic path in magnetic motors results in approximately doubling the COP. Modification of an ordinary magnetic engine of COP < 0.5 will not produce COP > 1.0. However, modification of available high efficiency (COP = 0.6 to 0.8) engines to use the Kawai process does result in engines exhibiting COP = 1.2 to 1.6. Two Kawai-modified Hitachi engines were rigorously tested by Hitachi engineers and produced COP = 1.4 and COP = 1.6 respectively. The Kawai process and several other Japanese overunity systems have been blocked from further development and marketing.

j) As a tenth suggestion, the Magnetic Wankel engine ^[22] should also be capable of COP > 1.0 and closed-loop self-powering, but apparently it has also been suppressed, as have all Japanese COP > 1.0 EM systems.

k) As an eleventh suggestion, multivalued magnetic potentials arise naturally in magnetics theory, but theoreticians do all in their power to minimize or eliminate their consideration. However, if deliberately used and optimized, the multivalued magnetic potential can provide a nonconservative field, where the $\int \mathbf{F} \cdot d\mathbf{s} \neq 0$ around a rotary permanent magnet loop. In theory, this can enable a "self-powering" permanent magnet rotary engine ^[23].

l) As a twelfth suggestion, certain passive nonlinear circuit components such as ferroelectric capacitors ^[24] have multiple nonlinear current processes ongoing inside. It is possible to utilize such components only during the time they pass the current against the applied voltage. By adroit switching, in theory one can intermittently connect and utilize such passive components as true negative resistors.

m) As a thirteenth suggestion, DeSantis et al. ^[25] showed that feedback systems with a multipower open loop chain can produce COP > 1.0 performance. Indeed, a frequency converter using 64 transistor stages and similar sophisticated feedforward and feedback mechanisms was placed in the original Minuteman missile, then deliberately modified to stop its demonstrated COP > 1.0 performance. Very quietly, Westinghouse engineers then obtained several patents ^[26] surrounding the technology, but no further mention of it appears in the literature.

n) As a fourteenth approach, Johnson ^[27] has built many novel linear and rotary motors and at least one self-powering magnetic rotary device — later stolen in a mysterious break-in at his laboratory — personally tested by the present author. Johnson uses a bidirectional "two particle" theory of magnetic flux lines which can be justified by Whittaker's earlier work showing the internal bidirectional energy flows in all potentials and fields. He also utilizes controlled spin-waves and self-initiated precise exchange forces, which are known to momentarily produce bursts of very strong forcefields ^[28]. His approach is to use highly nonlinear assemblies of magnets which initiate the foregoing phenomena at very precise points in the rotation cycle. In short, he seeks to produce precisely located and directed sudden magnetic forces, using self-initiated nonlinear magnetic phenomena. This is analogous to what the Wankel engine did using the Lenz law effect by sharply interrupting a weak current in an external coil. We point out that the Lenz law effect and other very abrupt field changes momentarily produce not only an amplified Poynting energy flow component, but also an amplified Heaviside energy flow component as well.

o) As a fifteenth approach, we previously proposed a patent-pending mechanism whereby a degenerate semiconductor alloy (say, of a bit of iron in aluminum wire) is utilized for the conductors of the external circuit. By obtaining an electron relaxation time of, say, a millisecond, one can excite the circuit with potential alone, then switch away the excitation source prior to its decay. In this way, pure asymmetrical regauging is used to excite the circuit, without requiring work (except for switching, which can be made very efficient). The excited circuit then discharges in Lorentz symmetrical fashion, but all the work in the load is "free". If LE is load energy and SE is switch energy utilized, this approach yields COP = LE ÷ SE and COP > 1.0 is possible.

p) We are presently working on a patent-pending, still-proprietary process whereby a permanent magnet is given a "memory" at will. By adroitly manipulating the memory, the magnetic flux from the magnet can be made

to prefer and take a desired magnetic path among several available. Once one controls what the flux "prefers" and when it prefers it, obviously $COP > 1.0$ is possible.

4) The system must dissipate the excess collected energy in the circuit in the load (and in the losses) without dissipating the source dipole, or by dissipating the source dipole much slower than it powers the load. For a two-wire circuit, one method might be to utilize a true negative resistor shunt^[29] in parallel with the primary source dipole but in its external circuit. In that way, some of the return current in the external circuit that is forced back up through the back EMF will not pass through the source dipole, but remain in the external circuit and the bypass. With that arrangement, less than half the energy collected in the circuit is then used to destroy the dipole, and with minimal losses in the external circuit, more power can be developed in the load than is dissipated in the source dipole to destroy it. Hence such a system exhibits $COP > 1.0$.

5) For self-powering of Maxwellian $COP > 1.0$ systems once developed, clamped positive energy flow feedback from output side to input side and excess collection from the Heaviside component can be used to power a motor turning the generator shaft, with the remainder of the output dissipated in a load. We stress that no laws of physics, electrodynamics, or thermodynamics are violated, nor are Maxwell's equations violated before arbitrary Lorentz regauging. The conservation of energy law is obeyed at all times. Such an open dissipative Maxwellian system — which is what is being described — rigorously is permitted to self-power itself in that fashion, as shown by Prigogine^[30] and others^[31] in the study of nonlinear systems far from thermodynamic equilibrium. But following Lorentz, electrodynamicists have arbitrarily discarded all such Maxwellian systems because it simplifies the mathematics!

Proof of the Available But Neglected Heaviside Energy Flow Component

To prove the ubiquitous existence of the Heaviside energy flow component, and to demonstrate that it can easily be tapped, one can refer to Bohren's^[32] demonstration that a resonant particle collects and emits up to 18 times as much energy as is input to it by conventional accounting (that is, in the Poynting component of the true energy input). Resonant particle absorption and emission is a $COP > 1.0$ process already proven and standard in the literature for decades; e.g., see the pioneering work by Letokhov [15]. The effect reported by Bohren was confirmed and verified, e.g., by Paul and Fischer^[33]. Bohren, Paul, Fischer, and other electrodynamicists are unaware that their energy input actually included the huge unaccounted Heaviside energy flow component as well as the accounted Poynting flow defined by reaction with a static unit point charge.

The reason for the $COP > 1.0$ in this process is that the resonant particle sweeps out a greater geometrical reaction cross section in the total energy flow than is included in Poynting's theory for a standard static particle's interception. In short, it proves that the neglected Heaviside component is present and can be readily intercepted to obtain real expendable energy. We did a back-of-the-envelope calculation for the relative magnitude in a simple DC circuit of the Heaviside component compared to the Poynting component. The neglected Heaviside component for a nominal simple circuit was on the order of 10¹³ times as great in magnitude as the feeble Poynting component. A more exact calculation would be welcomed, but we could not locate such a calculation in the literature^[34].

The Heaviside Energy Flow Component Was Arbitrarily Discarded

Practical EM power systems exhibiting $COP > 1.0$ are included in the Maxwell-Heaviside equations prior to Lorentz's symmetrical regauging^{[11][35]}, which changed the equations to a small subset of the Maxwell-Heaviside theory. Specifically, the Lorentz procedure arbitrarily discards that entire class of Maxwellian systems that are not in equilibrium with their active vacuum environment. It is precisely that discarded class of Maxwellian systems that contains all Maxwellian EM power systems exhibiting $COP > 1.0$, by functioning as open dissipative systems freely receiving and using excess energy from the active vacuum.

A Proposed Aspect of the Missing "Dark Matter" Gravitational Energy

Lorentz arbitrarily discarded the vast Heaviside energy flow component accompanying every EM field or potential and charge reaction — i.e., their reaction cross sections. The calculations of the fields, potentials, and energy radiations for all such reactions in the universe have grossly underestimated the actual EM energy involved, using only the reaction cross section of the field or potential to a unit point static charge. It follows that throughout the observed universe a myriad of interactions are pouring forth very large amounts of unaccounted

Heaviside EM field energy flow, across the universe in all directions. Consequently, at any location in space, there exists a vast flux of these Heaviside "dark radiation" energy flow components. Indeed, the nonlinear wave and field interactions of these unaccounted dark energy flows may be taken as what is "driving" the EM vacuum fluctuation of "zero-point" energy, essentially what is included in Puthoff's cosmological feedback principle^[55].

Three facts^[36] are of interest:

- (i) the local gravitational potential from the distribution of stars perpendicular to the Galactic plane seems greater than can be provided by the masses of known types of stars
- (ii) due to the decrease in luminosity to mass (or energy) in the outward direction from the center of galaxies, there must be some form of missing "dark" (non-Poynting radiant) matter (or alternatively, unaccounted and therefore "dark" energy flow) in the outer galactic regions which contributes to the gravity
- (iii) in clusters of galaxies it is known that there must be more mass (or dark energy) present than is contained in the visible (by Poynting detection) parts of galaxies

We point out that the Heaviside component of radiation,

- does in fact represent a "dark" form of radiated EM energy that is missed by standard detectors
- is arbitrarily excluded from the EM theory
- has been completely unaccounted in astrophysics, as well as elsewhere

Certainly the EM dark energy radiation is gravitational, so one may hypothesize this as a candidate or contributor to resolving the dark matter problem. In short, the dark matter problem may arise not because of missing matter, but because of unaccounted, undetected, and theoretically discarded dark radiation of Heaviside form. As with any other hypothesis, of course, this one requires falsification or validation by future experimental and theoretical investigations.

The "Scalar" Potential Is Not a Scalar Entity, But a Multi-Vectorial, Multi-Wave Entity

There is of course a scalar potential established between the two end charges of a source dipole. Let us examine what kind of energy flows actually comprise a "scalar" potential, and whether it is a scalar entity or actually a set of multi-wave multi-vector EM energy flows.

When a "scalar" potential is set upon a transmission line, it speeds down the line at nearly light speed, revealing its vector nature. When it is set onto the middle of the transmission line, it speeds off in both directions simultaneously, revealing its bidirectional vector nature. In addition to this observation, there is rigorous mathematical proof as well.

In 1903 E.T. Whittaker^[37] showed that the scalar potential identically is a harmonic set of longitudinal EM bidirectional wavepairs, where each wavepair is comprised of a coupled longitudinal EM wave and its phase conjugate replica. Hence the potential is a bidirectional, multiwave, multi-vectorial entity and an equilibrium condition in a myriad bidirectional flows of longitudinal EM wave energy. There is thus a vast, bidirectional, longitudinal electromagnetic wave "infolded electrodynamics" inside every potential and comprising it.

In 1904 Whittaker^[38] showed that any EM field or wave consists of two scalar potential functions, initiating what is known as *superpotential theory*^[39]. By Whittaker 1903, each of the scalar potential functions is derived from internally structured scalar potentials. Hence all EM fields, potentials, and waves may be expressed in terms of sets of more primary "interior" or "infolded" longitudinal EM waves and their impressed dynamics^[40]. This is indeed a far more fundamental electrodynamics than is presently utilized, and one which provides for a vast set of new phenomenology presently unknown to conventional theorists.

There is No Such Thing As An Isolated Charge in Space

From quantum electrodynamics and particle physics, it is known that "empty space" is filled with intense virtual particle activity. An "isolated charge in space" must interact with the fleeting virtual charges that appear and disappear in accordance with the uncertainty principle of quantum mechanics. Consequently, virtual charges of opposite sign will be drawn toward the observable charge, before they disappear. The result is a formation of denser virtual charges of opposite sign, surrounding the observable charge, and a polarization of the local vacuum. We may take a tiny "piece" of the observable charge, coupled with a nearby virtual charge of opposite sign during its existence, and consider the pair to be a dipole in a special "composite" (coherent virtual and observable) sense. So the "unit point charge" often used in electrodynamics to interact with the fields and potentials — and erroneously "define" them as their own reaction cross sections — is not really a point charge

at all but is a set of composite dipoles. Further, it occupies the "neighborhood of a point" rather than a point.

Each little composite dipole also has a "scalar potential" between its ends. We may decompose that potential into a harmonic set of bidirectional EM longitudinal wave (LW) pairs, where each pair consists of an outgoing LW and an incoming LW. Now, however, the incoming (convergent) LWs are virtual; i.e., comprised of organization and dynamics in the virtual flux of the vacuum.

We may repeat this analysis for each of the composite dipoles comprising the so-called "isolated observable charge".

So any "isolated charge" in fact organizes and dynamicizes the entire vacuum potential of the universe. The simple charge imposes negentropy and organization upon the entire vacuum, all across the universe. A vast set of "energy circulations" in the form of LWs and virtual LWs is established by charge-vacuum interaction, where a set of convergent virtual LWs feeds virtual energy continuously into the "charge", and the charge organizes some of its received energy into observable LW energy radiated out to the ends of the universe.

Each of the virtual particles comprising the composite end of the dipole, e.g., will also be accompanied by an organization of much finer, localized virtual particles of opposite sign. Hence another set of even finer composite dipoles is formed, each of which can again be decomposed into finer harmonic composite bidirectional LW wave sets.

The organization of the vacuum process continues at ever finer levels without limit.

A single electron organizes the entire vacuum energy of the universe, to a very surprising depth and degree. The vast, ever-changing interactions of the vacuum organization and dynamics, with particle dynamics, simply stretches one's imagination. But it is real, and the total energy content affected by each "reorganization" is enormous. This is an indication of the vast extent and dynamics of the "self-ordering" that the entire energetic vacuum performs, in response to the slightest stimulation by a charge. It also illustrates that the vacuum is a special kind of scalar potential, with internal Whittaker structuring and dynamics. To change the internal structuring of a potential requires no work, because no force is involved or translated against resistance. Virtual energy which appears and disappears need exhibit no inertia in this reordering, since the reordering occurs "between" the extinction of one virtual particle and the appearance of another. There is no "change of an ordering" in the classical sense, but only the "emergence of a new ordering." In short, in the causal domain (such as the active vacuum) prior to the invocation of the $\partial/\partial t$ observation operator, negentropy is readily and freely obtained on a massive scale.

It is therefore not surprising that the "self-organization action" of a small source dipole in a generator or battery should produce such an enormous reorganization of vacuum energy and such great negentropy as is demonstrated in the Heaviside component. It should also not be surprising that, with no available theory dealing with or even touching such matters, Lorentz simply chose to resolve the "Heaviside energy flow component" problem by eliminating it altogether. One result of the Lorentz integration of the energy flow vector around a closed surface was to eliminate all that intense negentropic self-reorganization of the local vacuum that did not interact immediately with the circuit. In today's terms, he effectively eliminated vacuum energy engineering from electrodynamics. Decades later, the vision of vacuum engineering was glimpsed by modern physicists such as Lee^[41]. But vacuum engineering by electrodynamic means, though fairly straightforward and practical by extended electrodynamics, is still missing from electrodynamics by arbitrary exclusion.

Field and Potential Are Erroneously Equated As Their Own Reaction Cross Sections

As we stated, neither the scalar potential's magnitude nor the field's magnitude is calculated in conventional classical electrodynamics^[42]. Instead, only the magnitude of the static particle reaction cross section of the potential or field is calculated at each point in space where it exists. Assuming a unit point static charge at each point in space occupied by the "scalar" potential, each of the longitudinal EM waves comprising the potential is slightly diverged around the intercepting charge. The amount of energy in the stationary divergence of all the waves around the point charge is rigorously the reaction cross section of the potential, not the magnitude of the potential itself. The small amount of water diverged from a river's flow, around a small fixed pebble on the bottom, is most certainly not the magnitude of the river itself. A tiny whirlpool in a river is not the river itself.

The magnitude of any nonzero potential is indefinite, since as much energy as one wishes can be collected from it (from its composite unceasing energy flows driven by the negentropic charged vacuum), if one uses sufficient intercepting charge q . That of course is shown by the simple equation $W = \phi q$, where W is the total energy collected by intercepting charges q from a potential (set of bidirectional longitudinal EM wave flows) having static particle reaction cross section ϕ . If the particles comprising q are resonated, W increases up to 18 times greater.

A similar situation exists in the erroneous "definition" of a field as its own static particle reaction cross section.

The very "definitions" of field and potential have been corrupted in conventional electrodynamics to only include their Poynting (intercepted and diverged) energy flow component, and to discard their enormous Heaviside (nondiverged) energy flow component. A priori, classical electrodynamics (CEM) does not calculate the field or the potential, but only a tiny (Poynting-based) component of each — precisely that tiny portion diverged around an arbitrarily assumed unit point static charge. CEM calculates the reaction cross section only for a stationary intercepting/diverging static particle. The actual reaction cross section will be changed, e.g., for a resonant (nonstationary) particle, without any change in the true field or potential. The resonant particle will therefore seem to collect and output "more energy than was actually input to it", as shown by Bohren^[32] and others^[33]. It collects the additional energy from the neglected Heaviside energy flow component unwittingly input by the researchers but not accounted by them.

In the topological approach to EM fields, such as in modern gauge field theory, this problem is bypassed and does not occur. But the problem remains a serious foundations problem in orthodox electrodynamics not based on gauge field theory and topology. Thus it remains a serious problem of omission in the electrodynamics used to design and build electrical power systems.

The continued presence in electromagnetics of such major foundations non sequiturs is responsible for our present "energy crisis." A single large electrical power plant generates sufficient Heaviside energy flow to power all electrical loads on Earth, were it intercepted, collected, and used to power loads without destroying the source dipoles in the generators. Indeed, when the Heaviside component is considered, a single human body in its tiny double surfaces produces about 1015 joules per second of total energy flow! But its reaction cross section is only about 10-13. Hence it intercepts, collects, and dissipates only about 100 watts — enough to light a common light bulb^[43].

Open dissipative EM power systems freely receiving and using environmental energy from the ignored Heaviside component are permitted by the Heaviside-Maxwell equations before arbitrary Lorentz regauging.

In Classical Electrodynamics Charges are Implicitly Assumed to be Perpetual Motion Machines

In classical electromagnetics with an inert vacuum assumed, by implication the "source charge" has no external energy input. It is assumed to create its associated fields and potentials (and their energy), which then reach across the entire universe in all directions, changing the energy density of the entire vacuum potential of the universe. Since those fields and potentials in their entirety contain enormous energy, CEM implies that the source charge creates all that energy from nothing. This of course violates the primary maxim that energy cannot be created or destroyed. Consequently, as stated by Sen^[44], "The connection between the field and its source has always been and still is the most difficult problem in classical and quantum electrodynamics."

The problem is already resolved in particle physics, since the charge is a broken symmetry in its exchange with the vacuum. Hence it is an open system far from thermodynamic equilibrium in its active vacuum environment. As such, classical equilibrium thermodynamics does not apply to the charge. As an open dissipative system, the source charge is permitted to

- (i) self-order (some of its received disordered virtual energy)
- (ii) self-oscillate (in this case, self-spin)
- (iii) power itself (its spin) and its output (continuous bidirectional EM energy flows across the universe, establishing the fields and potentials)
- (iv) exhibit negentropy

These capabilities follow from the well known theory of open systems far from thermodynamic equilibrium.

Even though we are using the customary terms "source" and "source charge" in this paper, there is really no such thing as a true "source". Semiz^[45] states it succinctly:

"The very expression 'energy source' is actually a misnomer. As is known since the early days of thermodynamics, and formulated as the first law, energy is conserved in any physical process. Since energy cannot be created or destroyed, nothing can be an energy source, or sink. Devices we call energy sources do not create energy, they convert it from a form not suitable for our needs to a form that is suitable, a form we can do work with."

The source charge and the source dipole are therefore special energy converters, freely converting some of the disordered vacuum EM virtual energy they receive into observable, ordered EM energy, and outputting that ordered component as the field energy and potential energy outpouring in all directions.

So we have argued that the basic "energy source" — the charge — is not a source but a transducer. Indeed, if Yilmaz^[46] is correct, then the ultimate energy sink — the black hole — may not exist as such either, once one corrects Einstein's elimination of gravitational energy as the only kind of energy not producing curvature of space-time.

Lorentz's Demons Can Be Identified In Every Electrical Power System

In the Lorentz symmetrical regauging, it is assumed that the potential energy of the system is changed twice (in two simultaneous asymmetrical regaugings) in carefully selected equal and opposite fashions, so that the two new force fields also formed are equal and opposite. We point out where these two Lorentz demons are invoked in the closed current loop.

First, we pay to asymmetrically regauge the generator to produce the source dipole initially.

The external circuit is then potentialized when the source dipole extracts an enormous energy flow from the vacuum and sends it through space surrounding the conductors of the external circuit. The surface charges intercept the tiny Poynting component and diverge it into the wires, potentializing the Drude electrons and freely exciting the system with excess energy.

The excitation energy is then dissipated in two equal parts, one half in the external loads and losses and one half in the source dipole itself, against the back emf. Using a simple dc example, the E-field E_1 across the circuit loads and losses is given by $E_1 = -\nabla V$, where V is the voltage between positive and ground terminal. The E-field E_2 generated upon the electrons in the current returned through the source dipole is $E_2 = \nabla V$ which then can return the electrons from the ground side to the positive terminal through the source dipole and against its potential. Hence $E_1 = -E_2$, and the two force fields (which are Lorentz's two asymmetrical demons) are equal and opposite. This is how Lorentz symmetrical regauging of the excitation discharge is accomplished.

Those "two Lorentz asymmetric but equal and opposite regauging demons" must appear and do appear in all EM power systems designed in accord with the Lorentz-regauged Heaviside Maxwell equations, since the demons are assumed in the equations themselves. The standard closed current loop circuit guarantees that the circuit forcibly and symmetrically discharges its free excess excitation energy, in accord with Lorentz symmetrical regauging of the Maxwell-Heaviside equations.

The limitation to $COP < 1.0$ is because the second Lorentz demon (driving the current back though the back emf of the source dipole) dissipates more energy to kill the dipole and shut off any further free self-excitation, than the first Lorentz demon dissipates in the external circuit's loads. COP may be defined as usable energy (usually load) output divided by the required energy input by the operator. To restore the scattered source dipole, we have to input as much energy to the generator (and a bit more to cover the generator's own inefficiencies) as was dissipated by the second demon in destroying the source dipole. We get less usable output energy (as work in the load) than we have to input to the generator. Thus the system exhibits $COP < 1.0$.

Further, the circuit killed its own dipole during the Lorentz excitation discharge. It is incapable of self-excitation again, since it also killed the local Heaviside energetic reorganization of the vacuum from which its Poynting excitation energy must be intercepted. So we must again pay to restore the source dipole, so that it again reorganizes its own local Heaviside vacuum and extracts additional Poynting energy from that reorganized vacuum's energy flow.

This self-crippling design of two fighting Lorentz excitation discharge demons in all our power systems keeps all

the coal trains moving, the fleets of oil tankers steaming, the natural gas being burned, the nuclear fuel rods being consumed, etc. It also keeps up the vast production of CO, CO² and other hydrocarbon combustion byproducts, as well as nuclear waste byproducts and their as yet unresolved storage problem. Even the storage problem for the CO² is now of epic proportion, and the planned injection of CO² in vast amounts underneath the bottom of the sea is a recipe for future global disaster. The huge combustion of hydrocarbons contributes to global warming and the remarkably accelerated melting of the polar icecaps, and in general seriously pollutes the biosphere, affecting and slowly strangling many living species.

AIAS Contributions To a New Electrodynamics

The *Alpha Foundation's Institute for Advanced Study* (AIAS) is a novel organization directed by Dr. Myron W. Evans, a noted scientist who has nearly 600 papers in the refereed literature. Other noted scientists such as Dr. Lehnert of the *Alfvén Laboratory* in Sweden and Dr. Vigier in the *Laboratoire de Gravitation et Cosmologie Relativistes*, Université Pierre et Marie Curie, Paris, France constitute the Fellows of the AIAS. A major effort has been underway by AIAS theorists (and a few other scientists as well) to extend electrodynamics into a non-Abelian electrodynamics in O(3) symmetry using gauge field theory^[47]. Numerous failings of the present U(1) electrodynamics have been pointed out by the AIAS in a series of papers published in the literature and others presently in the referee process. Some 70 AIAS extended electrodynamics papers are presently carried on a controlled Department of Energy (DOE) website for reference by DOE scientists. The papers are being published in journals as rapidly as possible.

In a recent AIAS group paper^[48] on the stress energy momentum tensor, it is shown that the Poynting vector in the received view is identically zero: *reductio ad absurdum*^[49]. In the new method, based on equating f with A , the Poynting flow in vacuo is unlimited, simply because the A_m drawn from the vacuum defines the Lehnert charge current density in the vacuum. A new paper in this area of vacuum energy, treating the subject in greater depth, has just been completed^[50]. The results appear direct from local gauge invariance. In the new method, it is only assumed that there is an A present in the internal gauge space, and that A can be subjected in vacuo to a local gauge transform.

Thus the vacuum is indeed a very active medium, filled with many kinds of real EM energy currents, and these energy currents may and do interact with EM circuits in such a manner that the circuits extract usable EM energy from the vacuum. As we have argued, conventional circuits receive all their EM energy from the vacuum interaction with the source dipole and not from the generator or battery. As is slowly being developed and published, there is a rigorous theoretical basis for extracting and using electrical energy directly from the vacuum. We also recognize the enormous contributions made by other advanced theorists outside the AIAS such as Barrett^[13-14, 51], Cornille^[52], Ziolkowski^[53], Letokhov^[15], Cole^[54] and Puthoff^[54, 55] as well as many others. We also specifically recognize inventors including Mills^[56], Shoulders^[20], Patterson^[57], Lawandy^[58], Mead and Nachamkin^[59], Sweet^[60] (now deceased), Mandel'shtam et al.^[62], Bedini, and many others.

Conclusion

There are many foundations *non sequiturs* in classical electrodynamics that are sorely in need of correction; we have pointed out only a few. The present energy crisis has occurred largely as a result of continuing to perpetuate these major flaws in electrodynamics theory, and continuing to build our electrical power systems in accord with the flawed theory.

Most electrodynamicists hold the opinion that extracting usable electrical energy from the vacuum is extraordinarily difficult. In fact it is a very simple thing to do and has always been done by our power systems anyway. Just collect some charge (a composite dipole) or form a dipole, and the "scalar" potential between its end charges represents an organized, enormous, bidirectional flow of EM energy, established over the entire vacuum. Energy flows outward from the dipole to every point in the universe, and from every point in the universe energy converges back to the dipole, as shown by Whittaker^[37] nearly a century ago. Since the beginning, every electrical load has been powered by energy extracted directly from the vacuum, and not by the heat produced from all the hydrocarbons burned and nuclear fuel rods consumed, or by the energy from the hydroturbines and waterwheels turned by dams across streams, or by windmill-powered generators, or by solar cells, etc.

The problem is in collecting and using the enormous energy easily extracted from the vacuum, not in simply producing the direct Heaviside EM energy flows. In short, the problem is how to obtain much more Poynting energy from the easily available and enormous Heaviside energy. One can build a "vacuum energy extractor"

for less than a dollar. Simply place a charged capacitor (or electret) upon a permanent magnet, so that the E-field of the capacitor is at right angles to the H-field of the magnet, and the energy flow from the magnet (a function of $E \times H$) is maximized^[61]. The system will extract energy from the vacuum and steadily output it indefinitely as a Heaviside energy flow. It does, however, sharply focus attention on the real problem of how to collect and use some of the energy from the balanced vacuum energy circulations set up by the system between the local vacuum and the distant, nonlocal vacuum. Again, the problem is how to convert Heaviside energy flow to Poynting energy flow.

Once the vacuum energy transducer (generator's source dipole) is in place, it is another matter to intercept, collect, and use the "modified local vacuum circulation energy" pouring from the transducer to power loads, and to do so without destroying the source dipole created in the collecting generator. Unfortunately our power scientists and engineers have been focusing upon the wrong end of the problem.

This is one of the great ironies in the history of science: All the hydrocarbons ever burned, all the steam turbines that ever turned the shaft of a generator, all the rivers ever dammed, all the nuclear fuel rods ever consumed, all the windmills and waterwheels, all the solar cells, and all the chemistry in all the batteries ever produced, have not directly delivered a single watt into the external circuit's load. All that incredible fuel consumption and energy extracted from the environment has only been used to continually restore the source dipole that our own closed current loop circuits are deliberately designed to destroy faster than we restore them.

We strongly urge the rapid, high priority development of permissible $COP > 1.0$ EM power systems which violate the Lorentz symmetrical regauging condition in their discharge of free excitation energy received from the vacuum via the source dipole. We will gladly contribute our own findings to the effort, including citing $COP > 1.0$ power systems^[62] and negative resistors^{[81][63][29]} produced by known scientists and documented in the literature, but usually suppressed by fierce scientific resistance to any dramatic change in U(1) electrodynamics and the Lorentz condition.

It is known in particle physics that there can be no symmetry of a mass system without the incorporation of the active vacuum interaction, yet this too is missing from classical electrodynamics. Symmetry implies nonobservables, and asymmetry implies observables. So every observable mass system, being asymmetrical a priori, must be accompanied by nonobservables interacting with it, else it can have no symmetry (or equilibrium). Yet classical electrodynamics continues to assume equilibrium and symmetry in observable systems without incorporating the active vacuum. Everywhere we examine classical electrodynamics, we find non sequiturs of first magnitude. This alone should be a compelling reason for the scientific community to assign the highest priority, ample funding, and the best theoreticians to the sorely-needed revision of electrodynamics from the foundations level up.

With vigorous and refocused attention by the scientific community to a more proper development of the electrodynamics of energy systems and circuits, self-powering $COP > 1.0$ electrical power systems fueled by vacuum energy can be developed and deployed in rather straightforward manner. The problem is nowhere near as complex as hot fusion or developing a large new accelerator. The cost of one large hydrocarbon-burning power-plant will allow the development to be done. The energy crisis can be solved forever. The present enormous pollution of the Earth's environment by hydrocarbon combustion and nuclear wastes can be dramatically lowered. Global warming can be slowed and eventually even reversed.

Our children, the biosphere, and the slowly strangling species on Earth will benefit enormously from that sorely needed scientific effort. We desperately need to do it, and we need to do it now.

REFERENCES

[1] . E.g., see T. D. Lee, Particle Physics and Introduction to Field Theory, Harwood, New York, 1981, p. 184. The broken symmetry of a dipole in its vacuum flux exchange has been known in particle physics for more than 40 years. In classical electrodynamics (CEM) the active vacuum and its exchange are omitted altogether, even though experimentally established for many years. The asymmetry between positive and negative charges was discovered in 1957. As Lee states, "Since non-observables imply symmetry, these discoveries of asymmetry must imply observables." There can be no symmetry of any observable system anyway, unless the vacuum interaction is included. Further, by the definition of broken symmetry, the proven asymmetry of the source dipole in the vacuum flux must extract and output observable energy.

[2] . See John D. Kraus, Electromagnetics, Fourth Edn., McGraw-Hill, New York, 1992. Figure 12-60, a and b, p.

578 shows the huge energy flow filling all space around the conductors, in a single pass circuit. Almost all of the energy flow misses the circuit entirely, is not diverged into the circuit to power it, and is just "wasted."

[3] . Poynting and Heaviside independently discovered the flow of energy through space. See J.H. Poynting, "On the transfer of energy in the electromagnetic field," *Philosophical Transactions of the Royal Society of London*, Vol. 175, Part II, 1885, p. 343-361; Oliver Heaviside, "Electromagnetic Induction and Its Propagation," *The Electrician*, 1885, 1886, 1887, and later; *Electrical Papers*, Vol. 2, 1887, p. 94, 405, 514; "On the Forces, Stresses, and Fluxes of Energy in the Electromagnetic Field," *Phil. Trans. Roy. Soc. Lond.*, 183A, 1893, p. 423-480. Poynting erroneously considered only that energy flow component entering the circuit, and completely missed the huge additional component shown by Heaviside that missed the circuit. Hence Poynting got the direction of the energy flow in error by essentially 90° , and was later corrected by Heaviside. In this paper we call the neglected nondiverged component of energy flow the Heaviside component.

[4] . Arguably the most influential Western electrodynamics text for 25 years has been J.D. Jackson, *Classical Electrodynamics*, Second Edition, Wiley, New York, 1975, which hardly addresses circuits at all. On page 237, following Lorentz, Jackson disposes of the huge nondiverted component of the energy flow in space around a circuit, that misses the circuit entirely and is wasted, with these words: "...the Poynting vector is arbitrary to the extent that the curl of any vector field can be added to it. Such an added term can, however, have no physical consequences." Since one properly adds only like entities, what is really true is that the energy flow component represented by Poynting's vector is defined as the divergence of a more general energy flow vector. Therefore, since the Poynting component is just the divergent fraction of this overall flow, the Poynting component can be (and is) accompanied by an unaccounted energy flow that has zero divergence. Since the divergence of the curl of any field is zero, Poynting's flow component is not a divergence from any flow component represented by the curl of a field. However, Jackson errs in implying that a zero-divergence energy flow present in one very general type of circuit can have no physical consequences. If we change the circuit so that part of the former "inconsequential" flow is now intercepted and diverged into the circuit, then additional real energy will be collected by the modified circuit from the former Heaviside energy flow component and it will perform additional useful work. Bohren's experiment (cited) clearly shows this. Twenty-one years later Jackson pointed out the decisive role played by the surface charges in the circuit; see J. D. Jackson, "Surface charges on circuit wires and resistors play three roles," *American Journal of Physics*, 64(7), July 1996, p. 855-870. But still he has not included the ignored Heaviside energy flow component, including in the third edition of his renowned text.

[5] . Heaviside realized both the diverged (intercepted) and nondiverged (nonintercepted) components of the energy flow associated with a circuit, corrected Poynting on the direction, and obliquely pointed out that the amount diverged into the circuit (the Poynting component) was tiny compared to the amount not diverged (which we have chosen to call the Heaviside component). See Heaviside, *Electrical Papers*, Vol. 2, 1887, p. 94. We quote as follows:

"It [the energy transfer flow] takes place, in the vicinity of the wire, very nearly parallel to it, with a slight slope towards the wire... . Prof. Poynting, on the other hand, holds a different view, representing the transfer as nearly perpendicular to a wire, i.e., with a slight departure from the vertical. This difference of a quadrant can, I think, only arise from what seems to be a misconception on his part as to the nature of the electric field in the vicinity of a wire supporting electric current. The lines of electric force are nearly perpendicular to the wire. The departure from perpendicularity is usually so small that I have sometimes spoken of them as being perpendicular to it, as they practically are, before I recognized the great physical importance of the slight departure. It causes the convergence of energy into the wire."

[6] . See H.A. Lorentz, *Vorlesungen über Theoretische Physik an der Universität Leiden*, Vol. V, *Die Maxwellsche Theorie* (1900-1902), Akademische Verlagsgesellschaft M.B.H., Leipzig, 1931, "Die Energie im elektromagnetischen Feld," p. 179-186. Figure 25 on p. 185 shows the Lorentz concept of integrating the energy flow vector around a closed cylindrical surface surrounding a volumetric element.

[7] . Consequently electrodynamicists caution against interpreting the Poynting vector as the true energy flow vector, pointing out that any nondivergent (flow) vector can be added to it — not realizing they are simply stating that an indefinite amount of nondivergent energy flow may be (and is) present in the erroneously discarded Heaviside component. In other words, any amount of nondiverged energy flow can be present in addition to their accounting because they deliberately fail to calculate or account for that component — present and available for every circuit.

[8] . It appears that the availability of this Heaviside energy component surrounding any portion of the circuit may be the long sought secret to Gabriel Kron's "open path" that enabled him to produce a true negative

resistor in the 1930s, as the chief scientist for General Electric on the U.S. Navy contract for the Network Analyzer at Stanford University. Kron was never permitted to release how he made his negative resistor, but did state that, when placed in the Network Analyzer, the generator could be disconnected because the negative resistor would power the circuit. Since a negative resistor converges surrounding energy and diverges it into the circuit, it appears that Kron's negative resistor gathered energy from the Heaviside component of energy flow as an "open path" flow of energy — connecting together the local vicinities of any two separated circuit components — that had been discarded by previous electrodynamicists following Lorentz. Hence Kron referred to it as the "open path." Particularly see Gabriel Kron, "The frustrating search for a geometrical model of electrodynamic networks," circa 1962. We quote:

"...the missing concept of "open-paths" (the dual of "closed-paths") was discovered, in which currents could be made to flow in branches that lie between any set of two nodes. (Previously — following Maxwell — engineers tied all of their open-paths to a single datum point, the 'ground'). That discovery of open-paths established a second rectangular transformation matrix... which created 'lamellar' currents..."

"A network with the simultaneous presence of both closed and open paths was the answer to the author's years-long search."

[9] . The Heaviside component represents a huge region of dynamic organization of the vacuum energy. There is no limit to such vacuum organization. It may surprise or even shock the reader that in general relativity there are really no conservation of energy laws as we know them, as was pointed out by Hilbert shortly after Einstein published his general theory. In D. Hilbert, *Göttingen Nachrichten*, Vol. 4, 1917, p. 21 Hilbert wrote: "I assert... that for the general theory of relativity, i.e., in the case of general invariance of the Hamiltonian function, energy equations... corresponding to the energy equations in orthogonally invariant theories do not exist at all. I could even take this circumstance as the characteristic feature of the general theory of relativity." Commenting on Hilbert's remarkable assessment, A.A. Logunov and Yu. M. Loskutov in their "Nonuniqueness of the predictions of the general theory of relativity," *Sov. J. Part. Nucl.*, 18(3), May-June 1987, p. 179 made the following statement:

"Unfortunately, this remark of Hilbert was evidently not understood by his contemporaries, since neither Einstein himself nor other physicists recognized the fact that in general relativity conservation laws for energy, momentum, and angular momentum are in principle impossible."

In simple language, the reason is as follows: The organization of the vacuum represents a change to the "primal cause" or "primal energy." Organization of energy without the involvement of mass effects does not require work, because force is not involved and work ultimately involves the translation of a resisting mass. So one can organize the "potential for doing work" without having to perform work in doing so. This is in fact what "regauging" actually involves. Any local region of the vacuum is after all an open system far from equilibrium with the surrounding rest of the vacuum. So that local region can exhibit,

- (i) self-ordering
- (ii) self-oscillation, self-spinning, etc.
- (iii) negentropy

To use this principle in practice, the trick is to "tickle" the local vacuum into performing the exact type of reordering and self-structuring that one wishes. One does this by adroitly changing the effect side of the observation process, thereby altering the causative side as well; a discussion of this process is well-beyond the extent of this document. In mechanics and electrodynamics the interaction of the effect back upon the cause has been erroneously omitted, but it is present in general relativity since curvature of spacetime (cause) acts on mass-energy (effect) to change it, and a change in mass-energy (effect) interacts back upon spacetime curvature (cause) to change it accordingly. A logical mess exists in electrodynamics, where the effect has been rather universally confused with the cause, and there exists not a single text or paper illustrating how the EM wave exists in spacetime. All illustrations continue to show the E-H planar (X-Y) wave in 3-space, which is an effect existing after the interaction with charge. What exists in spacetime before interaction must be E_t-H_t , since observation itself is a d/dt operator imposed upon LLLT and producing LLL. The integration of E-H along z does not add the missing time dimension, hence merely represents a "spatial composite" of many X-Y slices. Consideration of the E_t-H_t "impulse" or causal wave in spacetime prior to the interaction with matter, particularly in phase conjugation pairs, leads to many very interesting new phenomena, but that is beyond the scope of this paper.

[10] . The pertinent battery chemistry is well known; e.g., see David Linden, Editor in Chief, *Handbook of Batteries*, Second Edition, McGraw Hill, New York, 1995; see also Colin A. Vincent and Bruno Scrosati, *Modern Batteries: An Introduction to Electrochemical Power Sources*, Second Edition, Wiley, New York, 1997.

[11] . J.D. Jackson, *Classical Electrodynamics*, 2nd Ed., 1975. The application of Lorentz symmetrical regauging is shown on p. 219-220, with the erroneous statement on p. 220 that the resulting set of equations is equivalent in all respects to the Maxwell equations.

[12] . In several of his patented circuits, as analyzed and rigorously shown by Barrett.

[13] . When examined in a higher topology electrodynamics, Nikola Tesla's patented circuits do demonstrate this very functioning. For proof, see T.W. Barrett, "Tesla's Nonlinear Oscillator-Shuttle-Circuit (OSC) Theory," *Annales de la Fondation Louis de Broglie*, 16(1), 1991, p. 23-41.

[14] . Barrett later improved this mechanism for use in communication systems and patented it. See T.W. Barrett, "Active Signalling (sic) Systems," U.S. Patent No. 5,486,833, Jan. 23, 1996; "Oscillator-Shuttle-Circuit (OSC) Networks for Conditioning Energy in Higher-Order Symmetry Algebraic Topological Forms and RF Phase Conjugation," U.S. Patent No. 5,493,691. Feb. 20, 1996.

[15] . For the early discovery, see V.S. Letokhov, "Generation of light by a scattering medium with negative resonance absorption," *Zh. Eksp. Teor. Fiz.*, Vol. 53, 1967, p. 1442; *Soviet Physics JETP*, Vol. 26, 1968, p. 835-839; "Laser Maxwell's Demon," *Contemporary Physics*, 36(4), 1995, p. 235-243. For initiating experiments with external excitation of the medium, see N.M. Lawandy et al., "Laser action in strongly scattering media," *Nature*, 368(6470), Mar. 31, 1994, p. 436-438. See also D.S. Wiersma, M.P. van Albada, and A. Lagendijk, *Nature*, Vol. 373, 1995, p. 103. For new effects, see D.S. Wiersma and Ad. Lagendijk, "Light diffusion with gain and random lasers," *Physical Review E*, 54(4), 1996, p. 4256-4265; D.S. Wiersma, Meint. P. van Albada, Bart A. van Tiggelen, and Ad Lagendijk, "Experimental Evidence for Recurring Multiple Scattering Events of Light in Disordered Media," *Physical Review Letters*, 74(21), 1995, p. 4193-4196; D.S. Wiersma, M.P. Van Albada, and A. Lagendijk, *Physical Review Letters*, Vol. 75, 1995, p. 1739; D.S. Wiersma et al., *Nature*, Vol. 390, 1997, p. 671-673; F. Sheffold et. al., *Nature*, Vol. 398, 1999, p. 206; J. Gomez Rivas et al., *Europhysics Letters*, 48(1), 1999, p. 22-28; Gijs van Soest, Makoto Tomita, and Ad Lagendijk, "Amplifying volume in scattering media," *Optics Letters*, 24(5), 1999, p. 306-308; A. Kirchner, K. Busch and C. M. Soukoulis, *Physical Review B*, Vol. 57, 1998, p. 277. An excellent overview is in Diederik Wiersma and Ad Lagendijk, "Laser Action in Very White Paint," *Physics World*, Jan. 1997, p. 33-37.

[16] . M.W. Evans et al., *Classical Electrodynamics Without the Lorentz Condition: Extracting Energy from the Vacuum*, *Physica Scripta*, 2000 (in publication).

[17] . William B. Burford III and H. Grey Verner, *Semiconductor Junctions and Devices*, McGraw-Hill, New York, 1965, p. 281-291. Quoting p. 281 on point-contact transistors:
"...the theory underlying their function is imperfectly understood even after almost a century... although the very nature of these units limits them to small power capabilities, the concept of small-signal behavior, in the sense of the term when applied to junction devices, is meaningless, since there is no region of operation wherein equilibrium or theoretical performance is observed. Point-contact devices may therefore be described as sharply nonlinear under all operating conditions."
Our comment is that point-contact transistors can easily be developed into true negative resistors enabling COP > 1.0 circuits.

[18] . E.g., the anomalous quenching of the Hall effect generates a negative resistance effect. The Hall voltage across a narrow current-carrying channel in the presence of a perpendicular magnetic field B behaves anomalously around $B=0$. The Hall resistance fluctuates about zero and is "quenched", then rises to a plateau at higher fields, then recovers and exhibits normal behavior beyond that region. Also see Paulo N. Correa and Alexandra N. Correa, "Electrochemical Transduction of Plasma Pulses," U.S. Patent No. 5,416,391, May 16, 1995; patent no 5,449,989, "Energy Conversion System," Sept. 12, 1995; and related patent no. 5,502,354, Mar. 26, 1996. See also cited patents by Mills and by Shoulders.

[19] . T.E. Bearden, "Formation and Use of Time-Reversal Zones, EM Wave Transduction, Time-Density (Scalar) EM Excitation and Decay, and Spacetime Curvature Engines to Alter Matter and Convert Time Into Energy," Invention Disclosure Document #446522, Oct. 26, 1998. While this paper is proprietary, some overall details have been given in T.E. Bearden, "EM Corrections Enabling a Practical Unified Field Theory with Emphasis on Time-Charging Interactions of Longitudinal EM Waves," *Explore*, 8(6), 1998, p. 7-16; and in T.E. Bearden, "Toward a Practical Unified Field Theory and a Deep Experimental Example," presented at the INE Symposium, University of Utah, Aug. 14-15, 1998.

[20] . Kenneth R. Shoulders, "Energy Conversion Using High Charge Density," U.S. Patent # 5,018,180, May 21, 1991. See also Shoulders' patents 5,054,046 (1991); 5,054,047 (1991); 5,123,039 (1992), and 5,148,461 (1992). See also Ken Shoulders and Steve Shoulders, "Observations on the Role of Charge

Clusters in Nuclear Cluster Reactions," *Journal of New Energy*, 1(3), Fall 1996, p. 111-121. A proposed theory is given by Shang-Xian Jin and Hal Fox, "Characteristics of High-Density Charge Clusters: A Theoretical Model," *Journal of New Energy*, 1(4), Winter 1996, p. 5-20.

[21] . Teruo Kawai, "Motive Power Generating Device," U.S. Patent No. 5,436,518, Jul. 25, 1995.

[22] . For details, see T.E. Bearden, "The Master Principle of EM Overunity and the Japanese Overunity Engines," *Infinite Energy*, 1(5&6), Nov. 1995-Feb. 1996, p. 38-55; "The Master Principle of Overunity and the Japanese Overunity Engines: A New Pearl Harbor?", *The Virtual Times*, Internet Node www.hsv.com, January 1996.

[23] . T.E. Bearden, "Use of Regauging and Multivalued Potentials to Achieve Overunity EM Engines: Concepts and Specific Engine Examples," *Proceedings of the International Scientific Conference "New Ideas in Natural Sciences," St. Petersburg, Russia, June 17-22, 1996; Part I: Problems of Modern Physics, 1996, p. 277-297.*

[24] . E.g., see phenomena detailed in Martin Diestelhorst; Horst Beige, and Ralph-Peter Kapsch, "Parametric small signal amplification near pitchfork bifurcations," *Ferroelectrics*, Vol. 172, 1995, p. 419-423. In particular, multivalued conjugate reflectivities may become involved in some ferroelectric capacitors; see S. Itoh et al., "Simulational and experimental studies on anomalous reflectivity of phase conjugate wave." *Ferroelectrics*, Vol. 170, 1995, p. 209-217.

[25] . Romano M. DeSantis et al., "On the Analysis of Feedback Systems With a Multipower Open Loop Chain," Oct. 1973, AD 773188, available through the U.S. National Technical Information System.

[26] . J. H. Andreatta, "High Power Switching Amplifier Wherein Energy is Transferred to a Tuned Circuit During Both Half Cycles," U.S. Patent No. 3,239,771, Mar. 8, 1966; Tom L. Dennis, Jr., "Highly Efficient Semiconductor Switching Amplifier," U.S. Patent No. 3,239,772, Mar. 8, 1966; Heber J. Morrison, "Square Wave Driven Power Amplifier," U.S. Patent No. 3,815,030, June 4, 1974.

[27] . Howard R. Johnson, "Permanent Magnet Motor." U.S. Patent No. 4,151,431, Apr. 24, 1979. See also Johnson's U.S. Patents 4,877,983, Oct. 31, 1989 and 5,402,021, Mar. 28, 1995.

[28] . For an exposition of exchange forces and exchange energy, see B. D. Cullity, *Introduction to Magnetic Materials*, Addison-Wesley, Reading, MA, 1972; A.G. Gurevich and G.A. Melkov, *Magnetization Oscillations and Waves*, CRC Press, 1996; Victor S. L'vov, *Wave Turbulence Under Parametric Excitation: Applications to Magnets*, Springer-Verlag, Berlin, 1994. See also V.S. L'vov and L.A. Prozorova, "Spin Waves Above the Threshold of Parametric Excitation," in A.S. Borovik-Romanov and S.K. Sinha, Eds., *Spin Waves and Magnetic Excitations*, North-Holland, Amsterdam, 1988.

[29] . Negative resistor candidates for such a shunt may arise from point-contact transistors and from the work of Chung et al. See Shoukai Wang and D.D.L. Chung, "Apparent negative electrical resistance in carbon fiber composites," *Composites, Part B*, Vol. 30, 1999, p. 579-590. Chung et al. found that the carbon fiber composite can be produced as either a negative resistance or a positive resistance, by controlling the production process.

[30] . Ilya Prigogine, *From Being to Becoming: Time and Complexity in the Physical Sciences*, W.H. Freeman and Company, San Francisco, 1980. In 1977, Russian-born Belgian chemist Ilya Prigogine received the Nobel Prize for chemistry for contributions to nonequilibrium thermodynamics, especially the theory of dissipative structures.

[31] . E.g., see L. Brillouin, "Life, thermodynamics, and cybernetics," *Am. Sci.* Vol. 37, 1949, p. 554-568; G. Nicolis and I. Prigogine, *Exploring Complexity*, Piper, Munich, 1987.

[32] . Craig F. Bohren, "How can a particle absorb more than the light incident on it?" *American Journal of Physics*, 51(4), Apr. 1983, p. 323-327. The resonant particle simply sweeps out a greater geometrical area intercepting an incident energy flow than does a static particle. Hence the Bohren resonant particle intercepts not only the Poynting energy flow component (the one intercepted by the static particle), but also part of the neglected Heaviside component that does not interact with the static particle. In short, Bohren's work conclusively proves the existence of the Heaviside component of energy flow, and also clearly demonstrates an open dissipative EM system process exhibiting $COP > 1.0$.

[33] . H. Paul and R. Fischer, "Comment on 'How can a particle absorb more than the light incident on it?'," *American Journal of Physics*, 51(4), Apr. 1983, p. 327.

[34] . In a private AIAS correspondence, Dr. Myron Evans, Director of the Alpha Foundation's Institute for Advanced Study (AIAS), has rigorously shown a variety of EM energy components in the vacuum topology which can and do interact with electromagnetic circuits. He has shown that these energy currents enter into integral interactions where the constant of integration does capture the Heaviside component. This work will be published in *Contemporary Optics and Electrodynamics*, 3 volumes, Wylie, 2001 (in preparation).

[35] . Effectively Ludwig Valentin Lorenz first symmetrically regauged the Heaviside-Maxwell equations in Lorenz, "On the identity of the vibrations of light with electrical currents," *Philosophical Magazine*, Vol. 34, 1867, p. 287-301, not long after Maxwell's seminal 1864 oral presentation of his paper, "A dynamical theory of the electromagnetic field," published in *Philosophical Transactions of the Royal Society of London*, Vol. 155, 1865. When the prestigious H.A. Lorentz later adopted the symmetrical regauging because it provided simpler equations that were easier to solve, electrodynamicists adopted it quickly. No one seemed to notice that physically this constituted the arbitrary and total discard of all Heaviside-Maxwell systems not in thermodynamic equilibrium with their active vacuum. Even Jackson, 2nd Edition, *ibid.* erroneously states that the Lorentz-regauged equations are the same in every respect.

[36] . E.g., see Malcolm Longair, "The New Astrophysics," in Paul Davies, Ed., *The New Physics*, Cambridge University Press, New York, 1989 — specifically "Dark matter in galaxies and clusters of galaxies," p. 163.

[37] . E.T. Whittaker, "On the Partial Differential Equations of Mathematical Physics," *Mathematische Annalen*, Vol. 57, 1903, p. 333-355. In addition to Whittaker's sum set of waves comprising the "scalar" potential, Ziolkowski added the product set. See Richard W. Ziolkowski, "Exact Solutions of the Wave Equation With Complex Source Locations," *Journal of Mathematical Physics*, 26(4), April 1985, p. 861-863.

[38] . E.T. Whittaker, "On an Expression of the Electromagnetic Field Due to Electrons by Means of Two Scalar Potential Functions," *Proc. Lond. Math. Soc., Series 2*, Vol. 1, 1904, p. 367-372. The paper was published in 1904 and orally delivered in 1903.

[39] . An overview of much of superpotential theory is given by Melba Phillips, "Classical Electrodynamics," in *Principles of Electrodynamics and Relativity*, Vol. IV of *Encyclopedia of Physics*, edited by S. Flugge, Springer-Verlag, 1962.

[40] . One might appropriate the Russian name "information content of the field" for this more fundamental interior EM, from which all other EM is made. The "infolded" electrodynamicism is largely ignored in the Western scientific community, which heretofore has erroneously equated "information content of the field" as mere spectral analysis. In so doing, it has dismissed an engineerable unified field theory of great power.

[41] . T. D. Lee, 1981, *ibid.*, p. 380-381. On p. 383 Lee points out that the microstructure of the scalar vacuum field (i.e., of vacuum charge and polarization structuring) is not utilized. Lee indicates the possibility of using vacuum engineering in "Chapter 25: Outlook: Possibility of Vacuum Engineering," *ibid.*, p. 824-828.

[42] . We stress that this error does not appear in the electrodynamicism work of Dr. Evans and the AIAS theoreticians. In that work a gauge field theoretic approach is used, and the field results directly from the topology, not from confusing the nonreacted field (the cause) in space with its reaction cross section upon a unit point static charge (i.e., with the reacted effect) as has been done in classical electrodynamicism theory.

[43] . However, the neglected Heaviside energy flow component is real EM energy and therefore gravitational. Considering the vast number of interactions in the cosmos and the neglect of their Heaviside energy flow components, we propose that this enormous, unaccounted, ubiquitous energy probably accounts for the missing "dark matter" or "dark energy" of the universe, so ardently sought by the astrophysicists.

[44] . D.K. Sen, *Fields and/or Particles*, Academic Press, London and New York, 1968, p. viii.

[45] . Ibrahim Semiz, "Black hole as the ultimate energy source," *American Journal of Physics*, 63(2), Feb. 1995, p. 151.

[46] . Huseyin Yilmaz, "New approach to relativity and gravitation," *Annals of Physics*, Vol. 81, 1973, p. 179-200;

Annals of Physics (NY), Vol. 101, 1976, p. 413-432; Il Nuovo Cimento, Vol. 107B, 1992, p. 941; Carroll O. Alley, Per Kennett Aschan, and Hüseyin Yilmaz, preprint gr-qc/9506082 in the LANL archive, 30 June, 1995. Criticisms are given by Charles W. Misner, preprint gr-qc/9504050 in the LANL archive, 28 April 1995 and by F.I. Cooperstock and D.N. Vollick, Il Nuovo Cimento, Vol. 111B, 1996, p. 265.

[47] . E.g., see M.W. Evans et al., AIAS group paper, "A General Theory of Non-Abelian Electrodynamics," Foundations of Physics Letters, 12(3), June 1999, p. 251-265. See particularly M.W. Evans, "O(3) Electrodynamics," a review of 250 pages in M.W. Evans (ed.), Contemporary Optics and Electrodynamics, a special topical issue of I. Prigogine and S.A. Rice (series eds.), Advances in Chemical Physics, Wiley, New York, 2001, in preparation, vol. 114(2).

[48] . M.W. Evans et al., AIAS group paper, "Inconsistencies of the U(1) Theory of Electrodynamics: Stress Energy Momentum Tensor," Foundations of Physics Letters, 12(2), Apr. 1999, p. 187-192.

[49] . M.W. Evans, AIAS correspondence.

[50] . M.W. Evans et al., "Vacuum Energy Flow and Poynting Theorem from Topology and Gauge Theory," to be placed on the DOE website. It has also been submitted to a leading journal.

[51] . T.W. Barrett and D. M Grimes, [Eds.], Advanced Electromagnetism: Foundations, Theory, & Applications, World Scientific, Singapore, 1995. See particularly T.W. Barrett, "Electromagnetic Phenomena Not Explained by Maxwell's Equations," in A. Lakhtakia, (ed.), Essays on the Formal Aspects of Electromagnetic Theory, World Scientific Publishing, River Edge, NJ, 1993, p. 6-86.

[52] . Patrick Cornille, "Inhomogeneous waves and Maxwell's equations," Chapter 4 in Essays on the formal Aspects of Electromagnetic Theory, Ed. A. Lakhtakia, World Scientific, 1993, p. 138-182. Quoting, p. 168: "The calculation concerning the electromagnetic conservation laws given in most textbooks, for example in Jackson [Classical Electromagnetics, 2nd Edition, John Wiley, New York, 1975, p. 239] is not correct, as noted by Selak [Astrophys. Space Sci., Vol. 158, 1989, p. 159] et al., because it is not permissible to substitute a convective time derivative for an Eulerian time derivative even when we have a constant volume of integration."

[53] . E.g., Richard W. Ziolkowski, "Exact Solutions of the Wave Equation With Complex Source Locations," Journal of Mathematical Physics, 26(4), April 1985, p. 861-863; — "Localized Transmission of Electromagnetic Energy," Physical Review A, Vol. 39, 1989, p. 2005, — and Michael K. Tippett, "Collective effect in an electron plasma system catalyzed by a localized electromagnetic wave," Physical Review A, 43(6), Mar. 15, 1991, p. 3066-3072.

[54] . Daniel C. Cole and Harold E. Puthoff, "Extracting Energy and Heat from the Vacuum," Physical Review E, 48(2), Aug. 1993, p. 1562-1565.

[55] . H. E. Puthoff, "Source of Vacuum Electromagnetic Zero-Point Energy," Physical Review A, 40(9), Nov. 1, 1989, p. 4857-4862.

[56] . Randell Lee Mills et al., "Lower-Energy Hydrogen Methods and Structures," U.S. Patent 6,024,935, Feb. 15, 2000 with 499 claims recognized. Randell Lee Mills, "Energy/Matter Conversion Methods and Structures," Australian Patent No. 668678, Nov. 20, 1991. See also Art Rosenblum, "Randall L. Mills — New Energy and the Cosmic Hydrino Sea," Infinite Energy, 3(17), Dec. 1997-Jan. 1998, p. 21-34.; Eugene Mallove, "Dr. Randall Mills and the power of BlackLight," Infinite Energy, 2(12), Jan.-Feb. 1997, p. 21, 35, 41.

[57] . James Patterson, "System for Electrolysis of Liquid Electrolyte," U.S. Patent No. 5,372,688, Dec. 13, 1994. See also U.S. Patent Nos. 5,318,675; 5,607,563; 5,036,031; and 4,943,355.

[58] . Nabil M. Lawandy, "Optical Gain Medium Having Doped Nanocrystals of Semiconductors and Also Optical Scatterers," U.S. Patent No. 5,434,878, July 18, 1995. Lawandy's epochal experiment is described in Nabil M. Lawandy, et al., "Laser action in strongly scattering media," Nature, 368(6470), Mar. 31, 1994, p. 436-438.

[59] . Franklin B. Mead and Jack Nachamkin, "System for Converting Electromagnetic Radiation Energy to Electrical Energy," U.S. Patent No. 5,590,031, Dec. 31, 1996.

[60] . Floyd Sweet and T. E. Bearden, "Utilizing Scalar Electromagnetics to Tap Vacuum Energy," Proceedings of the 26th Intersociety Energy Conversion Engineering Conference (IECEC '91), Boston, Massachusetts, 1991,

p. 370-375. Sweet's solid state vacuum triode used specially conditioned barium ferrite magnetics whose H-field was in self-oscillation. The device produced a COP = 1.2×10^6 , outputting some 500 watts for an input of only 33 milliwatts. Sweet never revealed his complete ELF self-oscillation conditioning procedure for the magnets.

However, in ferromagnets, self-oscillations of,

(i) magnetization

(ii) spin-waves above spin-wave instability threshold

(iii) magnons are known at frequencies from about 1 kHz to 1 MHz

For an entry into this technical area with detailed reference citations, see A.G. Gurevich and G.A. Melkov, *Magnetization Oscillations and Waves*, CRC Press, 1996, p. 279. See particularly Victor S. L'vov, *Wave Turbulence Under Parametric Excitation: Applications to Magnets*, Springer-Verlag, Berlin, 1994, p. 214-218, 226-234, 281-289.

[61] . For that matter, the charged capacitor and the magnet are dipoles. Individually, each extracts and outputs enormous energy flow from the local vacuum, continuously pouring out the extracted energy toward the ends of the universe and thus establishing its fields and potentials by altering the entire ambient vacuum potential of the universe.

[62] . E.g., see L Mandelstam. [L.I. Mendel'shtam], N. Papalexi, A. Andronov, S. Chaikin and A. Witt, "Report on Recent Research on Nonlinear Oscillations," Translation of "Expose Des Recherches Recentes Sur Les Oscillations Non Lineaires," Technical Physics of the USSR, Leningrad, Vol. 2, 1935, p. 81-134. NASA Translation Doc. TTF-12,678, Nov. 1969. In the 1930s Russian scientists at the University of Moscow and supporting agencies developed and tested parametric oscillator generators exhibiting COP > 1.0. The theory, results, pictures, etc. are in both the Russian and French literature, with many references cited in this particular translation. Apparently the work was never resurrected after WW II. Other pertinent references are Mandelstam, L.I.; and N.D. Papaleksi., "On the parametric excitation of electric oscillations," *Zhurnal Tekhnicheskoy Fiziki*, 4(1), 1934, p. 5-29; Mandelstam, L. and N. Papalexi, "On resonance phenomena with frequency distribution," *Z.f. Phys.*, No. 72, 1931, p. 223; — "Concerning asynchronous excitation of oscillations," *Zhurnal Tekhnicheskoi Fiziki*, 4(1), 1934, p. TBD; — "Concerning asynchronous excitation of oscillations," *Zhurnal Tekhnicheskoi Fiziki*, 4(1), 1934; — "Concerning nonstationary processes occurring in the case of resonance phenomena of the second class," *Zhurnal Tekhnicheskoi Fiziki*, 4(1), 1934. See also A. Andronov, "The limiting cycles of Poincare and the theory of self-maintained oscillations," *Comptes-Rendus*, Vol. 189, 1929, p. 559. See also A. Andronov and A. Witt, "On the mathematical theory of self-excitations," *Comptes-Rendus*, Vol. 190, 1930, p. 256; — "On the mathematical theory of self-excitation systems with two degrees of freedom," *Zhurnal Tekhnicheskioi Fiziki*, 4(1), 1934; — "Discontinuous periodic movements and theory of multivibrators of Abraham and Bloch," *Bull. De l'Acad. Ed Sc. De l'URSS*, vol. 189, 1930. See also S. Chaikin, "Continuous and 'discontinuous' oscillations," *Zhurnal Prikladnoi Fiziki*, Vol. 7, 1930, p. 6; — and A. Witt, "Drift in a case of small amplitudes," *Zhurnal Tekhnicheskoi Fiziki*, 1(5), 1931, p. 428; — and N. Kaidanowski, "Mechanical relaxation oscillations," *Zhurnal Tekhnicheskoi Fiziki*, Vol. 3, 1933, p. 1.

[63] . E.g., a true negative resistor appears to have been developed by the renowned Gabriel Kron, who was never permitted to reveal its construction or specifically reveal its development. For an oblique statement of his negative resistor success, see Gabriel Kron, "Numerical solution of ordinary and partial differential equations by means of equivalent circuits," *Journal of Applied Physics*, Vol. 16, Mar. 1945a, p. 173. Quoting:

"When only positive and negative real numbers exist, it is customary to replace a positive resistance by an inductance and a negative resistance by a capacitor (since none or only a few negative resistances exist on practical network analyzers)."

Apparently Kron was required to insert the words "none or" in that statement. See also Gabriel Kron, "Electric circuit models of the Schrödinger equation," *Phys. Rev.* 67(1-2), Jan. 1 and 15, 1945, p. 39. We quote:

"Although negative resistances are available for use with a network analyzer,..."

Here the introductory clause states in rather certain terms that negative resistors were available for use on the network analyzer, and Kron slipped this one through the censors. It may be of interest that Kron was a mentor of Sweet, who was his protégé. Sweet worked for the same company, but not on the Network Analyzer project. However, he almost certainly knew the secret of Kron's "open path" discovery and his negative resistor.

The Final Secret of Free Energy

Foreword

This paper contains the real secret of tapping the vacuum energy very simply, using almost any source of potential (battery, electrostatic generator a la Swiss electrostatic device (the Testatika), elevated wire wire/250 V/m in the earth/ionosphere potential, etc). The objective is for the moderately technical reader to understand how to build and understand not only a single device, but also hundreds of different kinds of them. While it is quite simple, the "magic principle" contained in this paper only took me some 30 years to discover.

The precise definitions necessary to understand the free energy rationale are included. Also included are some very simple pseudo equations for the process. Do not underestimate these simple pseudo equations -- they tell the tale that's needed.

Also, there has been little or no time to "dress up" the paper. It's simply written down very informally, to get the necessary points across.

Nearly everything fundamental that we've been taught about EM energy is wrong or incomplete. Even the definition of energy in physics is wrong! Let me summarize a few of the things that are wrong with the classical electromagnetics (CEM) model as follows:

CEM is still utilizing a model based on a material ether. Although the Michelson-Morley experiment destroyed the material ether assumption in 1887, the classical EM model has never been corrected. It also contains no definition of charge, and no definition of potential. In many cases, algorithms to calculate a magnitude are boldly and erroneously advanced as "definitions." CEM still prescribes the force fields as the causes of all EM phenomena; it has been known since 1959 that forces are effects and not causes, that EM force fields exist only in and on the charged particles of mass in the physical system, and that the potentials are the primary causes of EM phenomena.

The lack of definitive definitions of mass and force in mechanics is carried over into EM theory; there is no adequate definition of EM force or of EM mass. The magnitude of the electrical charge on an electron is not quantized. Instead, it is discretized, being a function of the magnitude of the virtual photon flux (VPF) exchange between the vacuum and the charged particle.

When the charged particle is placed in a potential that differs from ambient, then the magnitude of the VPF -- and hence the magnitude of the electric charge on the electron -- is altered. The CEM assumption of an "empty vacuum" is totally falsified by modern quantum mechanics. The CEM notion that EM force fields and force field waves exist in vacuum is totally false. Only potentials and potential gradients exist in the vacuum. EM waves in vacuum are not force field waves as CEM prescribes; instead, they are oscillations of potentials and potential gradients. Potentials have a bidirectional EM wave-pair structure, where the bidirectional wave pairs are phaselocked in a harmonic series. In each wave pair, photons and antiphotons are continually coupling (into spin-2 gravitons) and decoupling.

This is where gravitation and electromagnetics are unified. The CEM notion that singular EM forces exist in either matter or the vacuum is false; Newton's third law requires that all forces exist in opposite pairs. Not a single one of the equations universally taught as "Maxwell's equations" ever appeared in any book or paper by James Clerk Maxwell; instead, they are Oliver Heaviside's equations. Maxwell's actual theory was written in quaternions, which is a complete system of mathematics. The Heaviside/Gibbs vector version:

- (1) has a lower topology
 - (2) is not a complete system of mathematics
 - (3) actually captured only a subset of Maxwell's actual theory
- Tensor theory does not recapture that which was lost.

There are even more errors in CEM, but these should suffice to make the point: Classical electromagnetics theory is seriously flawed, with archaic foundations, riddled with errors, and it should be completely redone. Until this revamping of CEM is accomplished, the present model solidly blocks free energy, antigravity, a unified physical field theory, and a unified theory of mind and matter interaction.

A second paper this year will detail the exact long-term causative mechanism for cancer and leukemia, and the exact mechanism for essentially 100% cure of terminal tumors in laboratory animals, demonstrated by the Priore team in France in the late 1960s and early 1970s. The same mechanism can be used to cure AIDS.

Throughout the world, humankind is suffering. In the poor populations of the world, early death is the norm, as is frequent famine. One third of the human race goes to bed hungry each night. Protein starvation of children is common. One third of the human race is infected with worms. Many other diseases ravage the far-flung poor peoples of the world. They have little or no industries. They have no abundant electrical power. They have little education, and little modern knowledge. They have little or no medical treatment. In short, they are born without hope; live in misery, filth, disease, and poverty, and die without dignity.

Meanwhile, the factories, cities, and enclaves of the "developed and developing" worlds belch forth fumes, toxic and hazardous wastes, and pollutants. They also spew forth weaponry which for one reason or another is used to arm the poorer nations, for use in destroying themselves and their impoverished neighbors. Warfare, terror, banditry, despotism, and all the four horsemen of the Apocalypse are truly loosed in the earth.

We simply must do better than that. And we can do better than that! But to do better, we've got to make the basics available to impoverished nations, cheaply and easily. Primary among their needs are energy and medical treatment. Given those, populations can be stabilized, people educated, development begun, and the living standard drastically elevated.

So that is the immediate goal. In this paper, I am freely giving away what required me an arduous 30 years of my life to discover. Shortly we will also detail the new methodology for a new therapeutic science, hopefully to cure the diseases that ravage humanity.

God willing, this paper will trigger a thousand, or even ten thousand, scientists and engineers to develop overunity energy devices. If so, shortly we can rid our biosphere of noxious automobile and factory exhausts, radioactive nuclear wastes, and massive oil spills. We can remove many of the hydrocarbon combustion pollutants from the air, stop acid rain and the destruction of our forests, and stop the steady rise of carbon monoxide in our air. If that truly tends toward a "Greenhouse" effect, then we can halt that effect as well.

The Creator has always given us bountiful free electrical energy, everywhere, easily and readily for the simple taking. It has only been our own blindness and folly that have prevented us from seeing and using this free energy bounty.

So here is the final secret of abundant, free electrical energy. Please use the knowledge well and see that its benefits also accrue to those impoverished ones who need it so desperately. Remember the adage, "Inasmuch as you have done it to these little ones..."

This is for those little ones. You are our brothers and sisters. We want you to live. And we want you to have a better quality of life, not just bare existence. We care.

Part I

Some Definitions

- The Quantum Mechanical Vacuum: First we need some definitions. We start by assuming the quantum mechanical vacuum.¹ Empty "spacetime" is filled with an incredibly intense flux of virtual particles. It is a plenum, not an emptiness. We shall be interested only in the fantastic flux of virtual photons, for we are discussing electromagnetics.
- Energy and Potential: Energy is any ordering, either static or dynamic, in the virtual particle flux of vacuum. EM energy is any ordering, either static or dynamic, in the virtual photon flux (VPF) of vacuum. That is, for a particular kind of "field" energy, we simply choose the so-called quantum particle of that field, and consider only that kind of virtual particle flux.

Potential is any ordering, either static or dynamic, in the virtual particle flux of vacuum. Hey! That's exactly the same definition as energy. Quite correct. Energy and potential are identically the same. Neither is presently defined correctly in physics.

Energy is normally defined as "Energy is the capacity to do work." That's totally false. Energy has the capacity to do work, because work is correctly defined as the dissipation (disordering; scattering) of energy (order). The scattering of energy is work. It is not energy! I.e., energy is not definable as its own scattering!

- Look at it this way: A man has the capacity to catch fish. That is true, but it is not a definition, since a definition must in some sense be an identity. You cannot say that a man is the capacity to catch fish! That may be a submitted definition, all right, but it is false. Similarly, energy has the capacity to do work; that is one of its attributes. But energy IS the ordering in the VPF (we are referring from now on primarily only to EM).
- Scalar and Vector Potentials: The scalar potential is any static (with respect to the external observer) ordering in the VPF of vacuum. The vector potential is any dynamic (with respect to the external observer) ordering in the VPF of vacuum. We shall be interested in the electrostatic scalar potential. So it is a static ordering -- a stationary template -- in the VPF of vacuum, much as a whirlpool is a stationary ordering (template, form) in the rushing flow of a river.

The Scalar Potential Has An Internal Structure

The Structure of the Scalar Potential:

According to rigorous proofs by Whittaker² and Ziolkowski,³ any scalar potential can be mathematically decomposed into a harmonic series of bidirectional wave pairs. Figure 1 shows this Whittaker/Ziolkowski (WZ) structure. In each pair, the forward-time wave is going in one direction, and its phase conjugate (time-reversed) replica wave is going in the other. According to the so-called distortion correction theorem⁴ of nonlinear phase conjugate optics, this PCR wave must precisely superpose spatially with its partner wave in the pair. The two waves are in-phase spatially, but 180 degrees out of phase in time. The wave is made of photons, and the antiwave (PCR wave) is made of antiphotons. It follows that, as wave and antiwave pass through each other, the photons and antiphotons are coupling and uncoupling with each other, because the antiphoton is a PCR photon, and PCR's precisely superpose spatially with their partner. A photon or antiphoton has wave characteristics, because it has a frequency; if the wave aspects are perfectly ordered and perfectly correlated, then so are the photon's particle aspects.

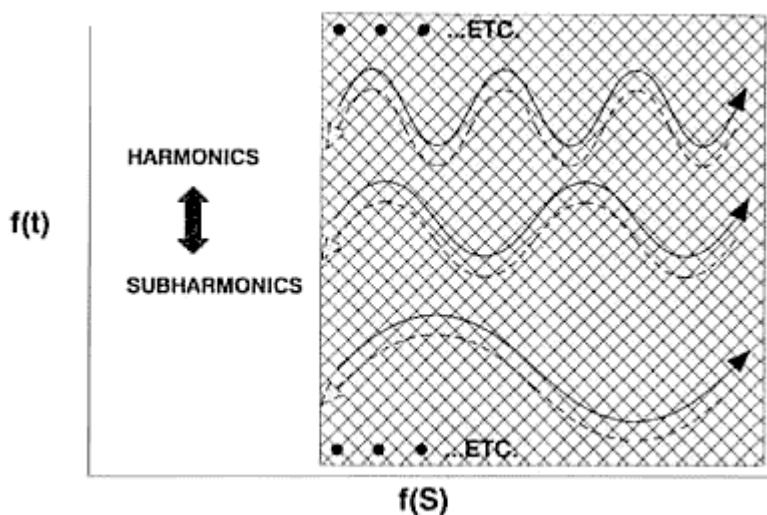


Figure 1a. Internal wave structure of the scalar potential.

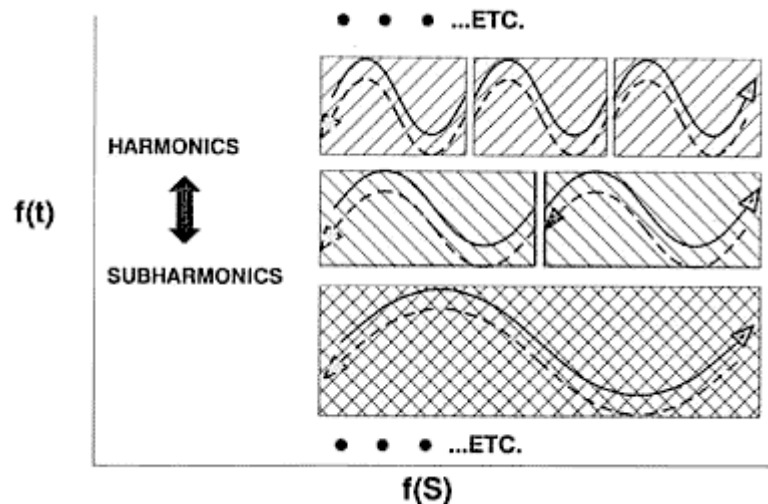


Figure 1b. Internal wave structure of the scalar potential (end).

A Potential Is An Ordering Across the Universe:

So we have -- astoundingly -- perfect VPF inner ordering infolded in the electrostatic scalar potential! We also have perfect wave/antiwave ordering infolded in there. When you collect a simple set of charges on a small ball or in a region, the scalar EM potential from that set of charges reaches across the universe. In it you have an infinite harmonic series of phase-locked time-forward EM waves going out from the charges to all distant points of the entire universe. And you have an infinite harmonic series of phase-locked time-reversed EM waves coming from all points of the universe, back to the "collected charges" source.

A Potential Is A River of Energy:

The point is, you have established a mighty, hidden, 2-way river of energy between that collection of charges and every other point in the universe. There is infinite energy in each of those infolded waves and antiwaves. But in a localized region, the energy density in each wave is finite. Since in finite circuits the potential interacts with a localized set of mass, we shall be concerned with the local energy density (joules/coulomb) of the potential.

But forget the conventional myth of visualizing the potential as pushing a unit charge in from infinity "against the force field" -- there isn't any force field in the vacuum, as is well-known in quantum mechanics. Also, Newton's third law requires all forces to occur in pairs -- each pair consisting of a force and its 3rd law reaction force. From that viewpoint alone, there is no such thing as an EM forcefield or force field wave in the vacuum. There are just gradients of the vacuum potential present in the vacuum. In the vacuum, an EM wave is actually a wave of the phase locked gradients of the electrostatic scalar potential and of the magnetostatic scalar potential. And each such gradient wave is simultaneously accompanied by its phase conjugate gradient wave, because of Newton's third law.

Newton's third law requires forces to occur in pairs of equal but antiparallel forces.

Both wave and antiwave co-exist simultaneously in the vacuum EM wave.⁵ Therefore it's a stress potential wave, not a force field wave. It's more like an electromagnetic sound wave,⁶ and so it is a longitudinal wave, not a transverse wave. In the EM vacuum wave's interaction with matter (the so-called "photon" interaction), the wave normally half interacts with the electron shells of the atom, giving translation forces, while the anti-wave half interacts with the atomic nucleus, giving the Newtonian 3rd law reaction (recoil) forces (waves). The EM wave in vacuum is an electrogravitational wave.

Energy Is Internally Infinite and Unlimited:

A static potential -- which is identically excess energy -- is internally dynamic and infinite. Energy is internally infinite and unlimited! But it has a finite energy density in a local region of spacetime. Since energy interacts with matter locally, we shall be concerned with the local energy density (joules per coulomb).

A Principle of Great Importance:

The only way you can have a "chunk" or finite amount of energy to dissipate in a circuit as work is to first have a potential's local energy density interact with a local finite mass collector. The normal interacting mass collector is the free electrons (the free electron gas) in the circuit. You can have, e.g., (joules/coulomb x coulomb); (joules/gram x grams); (joules/m³ x m³); etc.

Voltage, Force, Potential Gradients, Loads, and Work:

Now let's look at circuitry aspects. Conventionally they are a mess. Voltage is "essentially" defined as the "drop in potential." In other words, it's the dissipation (disordering) of a "finite amount" of potential gradient. But the only way you can get a "finite amount" of infinite energy/potential gradient is by first interacting the potential gradient's internal, finite, excess energy density with a finite "collector" mass. E.g., (joules/coulomb available for collection) x (coulombs collecting) = excess joules collected on the interacting coulombs, available for dissipation.

So voltage is really the dissipation of a finite collection of excess EM energy/potential gradient. The dissipation of potential or of its gradient is not potential! You cannot logically define either potential or energy as its own dissipation!

We presently use the notion of "voltage" in two completely contradictory ways in electrical physics. Here's how we got the confusion: We take a potential gradient (which has a local energy density), and we "collect" it across some charged masses in a locality -- usually the free electrons in the free electron gas in our circuitry. That is, we express the finite energy density of the potential gradient (before collection onto charges) in the local region in terms of energy per coulomb. The potential gradient actually is a change to the ambient potential, and so it contains an excess energy density (the magnitude may be either positive or negative). We then collect this potential (actually this potential density) on a certain number of coulombs, which places tiny little gradients of potential across (coupled to) each free electron.

The local excess energy density of the potential gradient multiplied by the amount of collecting mass gives the amount of excess energy collected (on the interacting charges/coulombs). On each collecting particle, that little gradient, together with the coupling particle, constitutes a tiny force. F is not just equal to ma (non relativistic case); instead, $F \propto (ma)$, where (mass x acceleration) is considered as a unitary, inseparable thing. So that little potentialized electron (that little EM force) moves itself around the circuit. In the load (scatterer), the little potentialized electron (the little force) is subjected to jerks and accelerations, thus radiating energy (shucking its gradient). Since this is done in all directions in the scatterer (load), that gets rid of the gradient, reducing the "little force" (potentialized electron) to zero because the little potential gradient is lost due to radiation.

Collecting And Dissipating Energy

Energy Dissipation and Collection:

Without further ado, we consider the scalar potential's local energy density in terms of joules per coulomb. That is, in a specific glob of charges (i.e., in finite circuits), the amount of energy collected from a potential gradient onto the finite number of charges receiving/collecting it, is equal to the number of joules of energy per coulomb that is in the potential gradient, times the number of coulombs collecting (receiving) the potential gradient. The current is the activated (potentialized) coulombs per second that dissipate their potential gradients during that second. The current multiplied by the time the current flows gives the activated coulombs that dissipated their activation (potentialization) during that flow time. Dissipating, activated coulombs multiplied by the excess energy collected per activated coulomb gives the energy dissipated (the work or scattering done) in the load.

We define collection as the connection of a potential gradient (a source) to the charged masses in a circuit element (the element is called the collector), which for a finite delay time does not allow its potentialized free electrons to move as current. In the collector, during this delay time these trapped electrons are "activated" by potential gradients being coupled to them.

Technically, that delay time in the collector is known as relaxation time,⁷ in the case of the free electron gas⁸ (in a wire or in a circuit element). A collector then is a circuit element that has a usable, finite relaxation time. During that relaxation time, the trapped electrons are potentialized without movement as current; each collecting/receiving free electron gets a little gradient across it, but no current yet flows. In other words, during this finite relaxation time (collection time), we extract potential from the source, but no current. Thus we extract energy (potential), but no power (which is voltage x amperage). During the relaxation time, we extract from the source only a flow of VPF, which is continually replaced in the source by the vacuum's violent VPF exchange with the source's bipolarity charges. We do not extract power from the battery/source during relaxation time, but

we extract free energy density. That free energy density, coupling with a finite quantity of electrons, gives us a collected finite amount of energy. With that background, let's start again, and go through this in a useful "free energy" manner.

The Electron Gas.

We refer to the conventional model of the free electron gas in a wire.⁹ Although the electrons in this gas actually move by quantum mechanical laws and not by classical laws, we shall simply be dealing with the "on the average" case. So we will speak of the electrons and their movement in a classical sense, rather than a quantum mechanical sense, as this will suffice very well for our purposes.

When one connects a circuit to a source of potential gradient (say, to a battery), the first thing that happens nearly instantly is that the potential gradient races onto the coupling wire and heads down it at almost the speed of light. As it goes onto the wire, this gradient "couples" to the free electrons in the free electron gas. However, inside the wire, these electrons can hardly move down the wire at all; they can only "slip" once in a while, yielding a "drift" velocity of a fraction of a cm/sec.¹⁰ On the surface, things are just a little bit different. Most of the "current" in a wire, as is well-known, moves along the surface, giving us the "skin" effect. [For that reason, many cables are stranded of finer wires, to provide more skin surface per cm³ of copper, and hence more current-carrying capability per cm³ of copper.]

So, initially, little gradients of potential appear on and across each free electron, with a single little $\nabla\phi$ on each electron, and coupled to it. The couplet of [$\nabla\phi \bullet m_e$], where m_e is the mass of the electron, constitutes a small ΔE_e . [This is rigorous; the conventional EM notion that an E field exists in the vacuum is absurd, and it is well-known in QM that no observable force field exists in the vacuum. As Feynman pointed out, only the potential for the force field exists in the vacuum,¹¹ not the force field as such. Or as Lindsay and Margenau pointed out in their Foundations of Physics, one does not have an observable force except when observable mass is present.¹²]. We have stated it even stronger: Not only is $F = ma$, but $F \propto ma$ (nonrelativistic case).¹³ Since no observable mass exists in vacuum, then no observable F exists there either.

Force, Coupled Gradients, and Electron Translation

Electrons Coupled to a Potential Gradient Move Themselves.

The point is, when activated by a "coupled potential gradient," the activated electron moves itself until it loses its activation (its coupled potential gradient).

Let me say that again, in a little more detail. Forget the standard notion that a force field such as the E-field causes electrons to move. Also forget the notion that the E-field is given by $E = -\nabla\phi$. In foundations of physics, those equations are known to be incorrect for the vacuum. EM force fields are known (in QM foundations theory) to be effects, existing only in and on the charged particles, and not existing separately at all,¹⁴ or in the vacuum at all.¹⁵ Instead of $E = -\nabla\phi$, in the vacuum the correct equation would be something like this: $PE = -\nabla\phi$. In this case, we have correctly stated that the potential gradient PE provides the potential for producing an antiparallel E-field in and on a coupling/collecting charged mass, and the magnitude and direction of that potential gradient will be given by $-\nabla\phi$, if and only if a charged mass particle is first introduced so that it couples to PE.

At any rate, the activated/potentialized electron moves itself. The reason is that it constitutes a force. Force \propto (mass x acceleration) (non relativistic case). So the potentialized/activated electron is continuously accelerating. However, it is prevented from easily moving down the wire directly. To begin to do that, it essentially has to first move to the outer skin of the copper conductor.

The Collector:

We now consider a circuit element that we called a collector. (It could be a special coil made of special material, a capacitor with doped plates rather than simple conducting plates, or any one of a number of things). The objective is for the collector to be made of special material so that it has a free electron gas whose electrons are momentarily not free to move as current (they continue to move violently around microscopically, but essentially with zero net macroscopic translation) for a finite delay (relaxation) time, while they are settling themselves upon the surface and preparing to move as current. Let's call the electrons NNTE (no net translation electrons) during that finite delay (relaxation time). During that "no-current" delay time, the NNTE electrons become potentialized/activated by the potential gradient impressed across the collector. So at the end of the NNT time,

the NNTE electrons are potentialized, and each is of the form $[\nabla\phi\bullet m_e]$.

The Secret of Free Energy

Two Circuits/Two Cycles: We are going to use two circuits and two cycles, as shown in Figure 2:

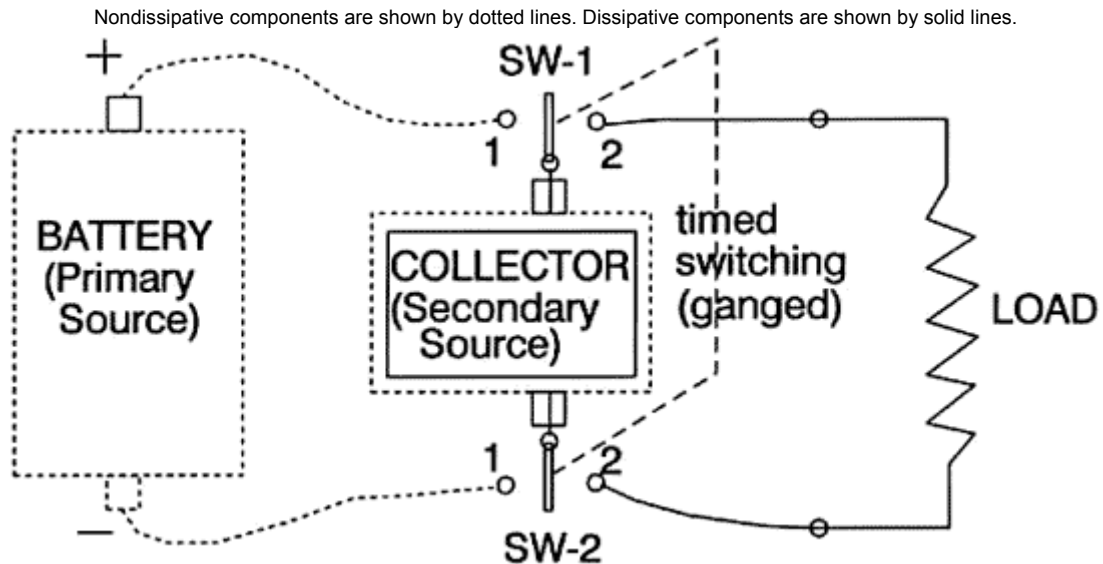


Figure 2. The secret of extracting and using free energy.

(1) We shall connect a collector to a primary source of potential (to a battery) during the short time that current does not yet flow, but potential does. (In other words, during the relaxation time of the collector, we allow the VPF to flow onto the NNTE electrons of the collector and potentialize (activate) them, but do not yet allow the electrons themselves to flow as current, but only to move transversely in the wiring and collector.) This is cycle one of a 2-cycle process: This is collection of a specific amount of current-free potential gradient -- power-free energy -- off the potential-source (the battery) onto a collector. During the collection cycle/time, current does not and must not flow (we are discussing the ideal case). We are freely "charging up" the collector as a secondary battery/source.

(2) At the end of the collection (potentialization/activation) time/cycle in circuit one, the potentialized collector (the charged secondary source) is sharply switched away from its connection to the primary potential source (the battery), and at the same time it is instantly switched into a separate closed circuit with the load. This is important: In cycle two, the potentialized collector (with its finite amount of excess trapped EM energy) and the load are connected in a completely separate circuit, and one that is closed, with no connection at all to the original source of potential (in this case, to the battery). Specifically, this "load and potentialized collector" circuit is completely separate from the primary source; during cycle two the primary source (the battery) is not connected to anything.

In other words, all we've taken from the primary source (the battery) is current-free, force-field-free potential gradient. So to speak, we've taken a "chunk of potential gradient" from the source, nothing else. You simply multiply the potential gradient's local energy density (the so-called "voltage", which is really excess joules per coulomb) by the number of coulombs of charge that is "activated" (that "collects" this voltage or excess joules/coulomb) in the collector. Specifically, we have not taken any power from the battery itself, and so we have not done any internal work inside the battery upon its internal resistance, by a "closed circuit electron flow" back into the battery. We have not permitted such a flow.

Instead, we are using the activated collector as a temporary, secondary battery. We will utilize this secondary battery in a conventional manner to power the load, which will also kill the secondary battery (dissipate its trapped EM energy). But that will not affect the primary source. The primary source is never used to directly power the load. It is only used as an infinite source of potential gradient (i.e., as an infinite source of energy density).

The Standard Power Extraction Circuit

The Conventional Circuit:

We digress momentarily: In the standard electrical method, the potential source (which is a bipolarity) is connected across the load. This connects both the external load and the internal resistance of the battery itself in series, as the "total circuit load." Electrons then pour through the external load circuit and through the internal battery resistance, from the "electron rich" polarity of the source to its "electron poor" opposite polarity. The scattering of energy in the internal battery resistance is actually doing work to upset the chemistry that is maintaining the battery's charge separation (the bipolarity). In this manner, the source's separation of charges (which is the "gate" furnishing the potential/energy gradient) is being destroyed as the current flows, and this in turn destroys the source of the potential gradient.

In other words, normally we, engineers, are trained to kill the bipolarity, which kills the potential source itself! Incredible as it may be, we, engineers and scientists, have been trained to utilize the free "trapped EM energy" furnished by nature through the source, to destroy the source of the energy/potential, with the same vigor as they power the external load! In fact, our teachers simply have never learned any other way to do it except this deliberately "self-destructive" manner!

A Waterwheel Analogy

Imagine, if you will, a waterwheel that powers a mill, with a sluice gate upstream in a river, that diverts some river water into the sluice carrying water to the wheel when the sluice gate is opened into the river. The diverted water flows down to the waterwheel, turning it, and the spent water is fed back into the river below the mill site. Now what fool would connect a pulley onto the waterwheel, with a rope running from the pulley to the sluice gate, so that when the wheel rotated, part of the rotational power also was utilized to close the sluice gate and shut off the water, stopping the waterwheel? If one did so, when the sluice gate was opened, the waterwheel would rotate only until the sluice gate was closed, shutting off the water. Then one would laboriously have to pay to reopen the sluice gate again, then again, then again.

No self-respecting "waterwheel engineer" would do such an unthinkable, insane thing. But that's exactly what we engineers, electrical physicists, and scientists have been trained to do! We have no energy engineers or energy scientists at all; instead, we have all been power engineers and power scientists. We have all been energy source killers! In this paper, we shall try to do better, and rectify "one of the most remarkable and inexplicable aberrations of the scientific mind which has ever been recorded in history," as Tesla called the conventional electromagnetics.¹⁶ By being energy engineers, we shall only have to pay for our energy source once, and then we shall draw as much energy from it as we wish.

External Load Power Is Free; Only The Power In The Source Costs

Here's the magic secret of free electrical power: The power in the external load is absolutely free, and it always has been free.¹⁷ In any load circuit, the only power you have to pay for, and have ever had to pay for, is the power you incorrectly use to kill your own primary source. The only power that "costs" more effort/dollars is the power erroneously utilized inside the source to "close the gate" and kill the primary source. Your electric power company doesn't pay for any of the collected energy on your load circuits that is dissipated to power your house. Instead, the power company charges you for its own ignorance. It charges you for its insane use of its own freely extracted electrical energy to continually kill the bipolarity in each of its generators, thus continually killing the free electrical source of that generator's energy.¹⁸

In any electric circuit, we can continue to indefinitely power the external load indirectly from a source, so long as we are not so naive as to use any of the free energy we extract from the primary source to dissipate back inside the primary source itself and shut it off!

And we can easily and freely multiply electrical potential. As an example, given a single good source of potential, a hundred radial wires can be connected to the source. The same potential will now appear at each of the ends of the hundred wires. A switcher/collector unit can then operate from each radial line's end, and power external loads, without "loading" the original primary source. This "cascading" can be continued indefinitely. A single power plant, e.g., can power the entire electrical grid of the United States. And a single automobile battery can power a large, agile, electric automobile at highway speeds, with sports car acceleration, with unlimited range, without "refueling," and with no noxious chemical exhaust.

Obvious Impacts

Environmentalists should immediately see that the chemical pollution of the biosphere by mechanistic and processes to obtain energy can be dramatically reduced, to almost negligible levels. There need be no huge oil tanker spills, for there need be no huge oil tankers. There need be no worrisome radioactive wastes from nuclear power plants, or abandoned hazardous nuclear plants when their life is finished, because there need be no nuclear power plants. There need be no noxious exhausts from jet airplanes (which are really what is diminishing the ozone layer and punching holes in it), automobiles, trucks, buses, innumerable coal-fired and oil-fired power plants, etc.

The Electronic Smog Problem

In fairness we point out that, as the usage of free electrical energy mushrooms, we will be dramatically increasing the low-level EM signal density of the environment, and that too is biologically detrimental. Although beyond the scope of this paper, that cumulative biological damage mechanism has also been uncovered by this author. A formal paper is presently in preparation for presentation in March 1993 at the annual meeting and conference of the Alabama Academy of Science.¹⁹ The paper will also present an entirely new definition of cancer, give its exact long-term cumulative mechanism, and give an exact, scientifically proven mechanism for eliminating cancer, leukemia, and other debilitating diseases such as AIDS. For our purposes here, we simply state that we understand the EM "electronic smog" biological damage mechanism, and how to go about developing a total counter for it. Eventually, we would see a small "counter unit" added to each power unit, alleviating the "electronic smog" problem and preventing biological damage.

Only Dissipate Energy From a Collector, Not the Source

Completion of the Collection Cycle:

But to return to the completion of our collection cycle (cycle one). During collection, we have not extracted power from the source. That is vital. We have not moved the gate through which our source is furnishing free energy. We have not diminished our primary source. From our previous definitions of potential, we have indeed extracted trapped energy from the primary source, because we placed its "local energy density" across a certain finite collector/mass, instead of extracting power (dissipating energy inside the source or battery to spoil its chemistry and deplete its charge separation).

All Energy Is Free

Here's the incredible truth. The entire universe is filled with mind boggling free energy everywhere, in the simplest of things. Simply scrape your feet on the carpet, and you will collect perhaps 2,000 "volts" on your body. At that time, hidden EM energy is flowing from every point in the universe to your body, and from your body back to every point in the universe. We know that all macroscopic matter is filled with stupendous amounts of electrical charge. So an incredible river of energy -- a great flux -- is driving every single thing, from the smallest to the largest. Opening a gate to extract trapped EM energy is simple. Just collect a bit of charge, or scrape your feet hard, or comb your hair briskly. All we have to do is not be stupid and close the gate once we've got it opened!

God has been most kind. We have nothing but free energy everywhere. All energy is furnished to us freely! It's our own blindness that has made us into energy source killers. All we have to do is open our eyes to the truth of nature's incredible energy bounty. We must just freely collect that bountiful fruit from Nature's tree, instead of chopping down the tree and killing it.

Dissipating The Collected Energy

The Work Cycle:

We focus again on cycle two. Shortly after the now-potentialized collector is connected to the load at the beginning of cycle 2 (the power cycle, or energy dissipation cycle, or work cycle), the potential gradient across the potentialized collector is connected (transferred) across the free electrons in the load circuit. We assume that the material of the collector and the switching time have been designed so that, shortly after switching to the loading/work cycle, the activated/potentialized free electrons in the electron gas in the collector reach the skin of the collector, and are free to move as current.

So just after the beginning of cycle two, each of the free electrons in the load circuit now is potentialized and free to move down the wiring. Each potentialized (activated) electron has its own little individual potential

gradient across it and coupled to it, due to the overall potential gradient from the collector. Remember, prior to coupling to charges, this potential gradient moves through the circuit at light speed. An EM potential gradient coupled to a charged mass constitutes an EM force field (excess trapped EM energy per coulomb, times the number of collecting coulombs). Now each little free electron with its potential gradient forms a little E-field (force/charge), and that little E-field (force/charge) is free to move. That's all it takes to move (accelerate) the little activated electron's mass through the load (the scatterer). We strongly stress that the potentialized/activated electron moves itself. It doesn't care whether or not the external battery is attached or not. It is its own little motorboat, with its own little engine driving it.

As the little potentialized electrons reach the load (the scatterer), they bang and clang around in there erratically. That is, the "scatterer" (load) causes spurious accelerations ("scatterings") of these self-driven electrons. As is well-known, when a charge is accelerated, it radiates photons. What actually happens is that these little "jerked around" electrons shuck off their little potential gradients in the load (in the scatterer, or the "jerker-arounder") by emitting/radiating photons in all directions. Hence the heat that is produced in the load; the heat is just these scattered photons. The theory of calorimetry already states that all the excess energy (on the potentialized electrons) will be dissipated as this heat (scattered EM energy).

When all the potentialized electrons have radiated away their potential gradients in the load (scatterer), they are no longer potentialized. The free electron gas is again "quiescent" and no longer potentialized/activated (again, we are talking about "on the average" from a classical viewpoint).

Repetition and Review

Notice What We've Done:

We took some trapped EM energy density (a chunk of potential gradient, a "voltage" before current flows) from the source, by switching that potential gradient (energy density, which is joules per coulomb) onto a collector (containing a certain number of coulombs of trapped charges) where the potential gradient activates/potentializes/couples-to these temporarily non translating electrons. So the finite collector collected a finite amount of excess energy [joules/coulomb x collecting (trapped) coulombs] on its now-excited (activated) free electrons. Then, before any current has yet flowed from the source, we switched that potentialized collector (with its temporarily restrained but potentialized electrons; with their finite amount of excess trapped EM energy) away from the source and directly across the load. Shortly thereafter, the relaxation time in the collector expires. The potentialized electrons in the collector are freed to move in the external load circuit, consisting of the collector and the load, and so they do so. The scattering "shock collisions" due to the erratic electron accelerations in the load shake off the little potential gradients on the conduction electrons, emitting photons in all directions, which we call "heat." In shaking off the photons, the electrons lose their little potential gradients, hence lose their activation (excess EM energy).

Rigorously, we have extracted some energy in trapped form, and allowed it to dissipate in the load, "powering the load" for a finite discharge/dissipation time and doing work.²⁰ Contrary to the conventional electrical power engineering, we have also done this without doing any work inside the source to diminish its ability to furnish potential gradient.

What Is Energy In An Electric Circuit?

Energy in an Electric Circuit:

Here's the principle loud and clear. Energy in an electric circuit involves only the potentialization and depotentialization of the electron carriers in that circuit.²¹ It involves only the potential gradient (the joules per coulomb) collected by the circuit to potentialize its electrons, and the number of coulombs of electrons that are potentialized during the collection phase. Electric circuits simply utilize electrons as carriers of "potential gradients," from the source to the load, where these gradients and the activated electrons constitute excess trapped EM energy. In the "shocking/scattering" occurring in the load, the jerking (acceleration) of the electrons causes these activated (trapped-energy-carrying) electrons to shuck off their potential gradients by emitting them as scattered photons (heat).

If one is thoughtless enough to allow the primary potential source to remain in the circuit during the "work" phase, then one is using the potentialized electrons to also go back into the primary source and scatter energy from its internal resistance (internal load), thereby disorganizing the organization that was producing the source potential and energy in the first place. If one does that, then all the while one is getting some work (scattering of energy) in the load, one is also steadily getting some work done inside the primary source to steadily destroy it!

Literally, one is killing the goose that lays the golden eggs.

Continued Operations:

But back to our circuit. After we complete one full collection/discharge cycle, we wish to continue producing work in the external load. So we simply switch the collector back away from the load and onto the primary source, collect some more current-free potential, and again independently switch the collector with its repotentialized free electrons back across the load. We can repeat this two-cycle process to potentialize the external load and power it as long as we wish, from a battery or other source of potential, and never take any power at all from the primary battery. We do not need to drain the battery or source at all, in order to power a load, unless we attempt to power it directly. Powering the external load is always free!

Nature has been most kind, and we have been most ignorant. You can have all the trapped electrical energy you wish, from any source of potential, for free. You can power all the external loads you wish, for free, by using a collector as a secondary source, and simply shuttling potential between the primary source and the collector.²² But you cannot have power for free from (in) the potential source. If you allow current flow in your collection cycle, you are depleting the separated charges inside the battery that are furnishing the source potential.

The Coal-Fired Locomotive

Rigorous Analogy of a Coal-Fired Locomotive.

Now here's an exact analogy, to assist in understanding. Imagine a coal-fired train, and a fireman shoveling coal. He has an external load/scatterer of energy (the fire in the firebox under the boiler). He has a primary source of potential/energy (the coal car). No fireman in his right mind would ignite the coal in the chute of the coal bin, to try and get some heat energy into the firebox! [That is, he would not attempt to extract power from the source. Yet that's exactly what all we engineers are trained to do at present.] Instead, the fireman takes out (collects) a finite amount (a shovelful) of coal (trapped energy). Coal per se (the potential gradient) has a certain energy density per unit volume (trapped joules per unit volume of coal) and the shovel (collector) has a certain volume.

Accordingly, the shovelful of coal contains a certain amount of trapped joules of energy. In the fireman's shovel (the collector), the energy remains in totally trapped form, as coal not afire and without its trapped energy being dissipated as work. [He doesn't act like a fool and ignite the coal in the shovel either!] He then throws that shovel of coal (collected trapped energy) onto the fire (scatterer), completely separately from the coal bin/source. He continues to repeat his shoveling cycle, and each shovelful of coal added to the fire dissipates additional energy, powering the load.

The Free Energy Principle

All potential gradient (trapped excess energy density) is free for the taking²³. The potential is due to the violent VPF exchange between the vacuum and the separated bipolar charges furnishing the source potential gradient. The energy of the entire universe is flowing through that source potential. You can have as much of this internal VPF flux energy (potential) as you wish, as often as you wish, so long as you don't demand current (which is power, or the rate at which the energy is being freed and dissipated). It's really simple. You can have all the trapped energy you wish, from any source. You cannot connect to the source and start to dissipate the energy as power, however, without starting to close the "gate" from which your free trapped energy is coming.

In other words, here's the iron rule: If you draw current, you kill the bipolarity gate furnishing the potential gradient (source of energy density). In that case, you kill the source. If you do not draw current, you do not kill the bipolarity gate and you do not shut down the source. In that case, you can continue to "use" it and extract trapped EM energy from it forever.

Definitions Again

Definitions:

I'll put down some simple equations, that may help to explain it more exactly. First we repeat some definitions.

Energy is any ordering imposed upon the virtual particle flux of vacuum. EM energy is any ordering imposed upon the virtual photon flux of vacuum. Static energy is an ordering (a template) which is stationary with respect to the external observer. Dynamic energy is an ordering (a template) which is not stationary with respect to the external observer.

Potential: Any ordering imposed upon the virtual particle flux of vacuum. Scalar potential is an ordering (template) that is not moving with respect to the external observer. Vector potential is an ordering (template) that is moving with respect to the external observer.

The scalar EM potential is any static (with respect to the external observer) ordering imposed upon the virtual photon flux of vacuum. Etc.

Note again that energy and potential have exactly the same definition. Potential is in fact trapped energy. Scalar EM potential is static EM energy (to the external observer) or trapped (collected) EM energy. In other words, if one takes off a differential of potential onto a fixed number of coulombs, one takes off a certain magnitude of trapped EM energy. In other words, one takes out a shovelful of coal from the coal car.

Importance of Separation of Charges

We Must Not Dispel the Separation of Charges In Our Source:

The difference in our coal-fired train analogy and our electrical circuit is that, in the coal train, the coal in the coal car is not automatically and continually replenished. Also, the coal in the coal car has already been collected by the mass of the coal car, so it is not infinite. In the electrical circuit, the potential gradient in the primary source is continually replenished, automatically, and it is infinite (though it has a finite energy density). The reason is simple. EM potential (in the normal sense) is actually a virtual photon flux exchange between the vacuum (the entire vacuum, all over the universe) and a charged particle or collection of charged particles.²⁴ Thus the potential (gradient) is a powerful energy flux, pumped by the vacuum and the entire universe, that continues automatically, so long as we do not allow the collected charges in our bipolarity source to be dissipated. In terms of a battery, we achieved separation of charges inside the battery by chemical action, and we paid for that initially.

Once separated, the charges essentially stay separated (because of the chemistry) unless we foolishly do something to dissipate them, such as upsetting the chemistry, so they are no longer separated positive from negative. So if we don't do anything to these separated charges, they continue to be driven by their fierce exchange of virtual photon flux with the vacuum/universe. If we then simply extract some of that flux exchange, without moving the charges, we are directly "gating" trapped EM energy from the vacuum/charged particle VPF exchange.²⁵

The Potential Is Infinite And So Is Its Energy Content

You Can't Dip The Ocean Dry With a Spoon:

Let's say that another way. The charged particles in our potential source are in a constant, seething, equilibrium exchange of trapped EM energy with the entire universe. That energy exchange is so enormous that, if we gate some of it out to collect on some other "temporarily frozen" charges and potentialize/activate them, the vacuum flux doesn't even miss it. It's like dipping a spoonful of water out of the restless ocean. The hole is instantly filled, and the water replenished. We can dip with that spoon as much as we wish, and the ocean will never run dry, but will simply continue to furnish us water, spoonful by spoonful.

The same is true in our electric circuits. We can have all the potential (trapped EM energy density) we wish, for free, from a single source, so long as we do not allow work to be done inside the source to close off our "gate" and kill our primary source.

The Twisted Concept of Voltage

Before We Develop Some Pseudo-Equations:

In the equations we wish to develop, we have one problem, due to the lack of insight of conventional electrical physicists. That is, they have insisted upon "measuring" and expressing both the infinite potential (nondissipated) and a certain quantity of potential (dissipated) in volts. So they say "a potential of so many volts." That's nonsense, and totally erroneous. Rigorously, a voltage is a drop or a dissipation of so much (a finite amount of) collected excess potential/energy. You "measure" the voltage in a voltmeter by impressing a potential gradient upon the electron gas in the circuitry, wherein you collect or get in your voltmeter so much [(joules/coulomb) x coulombs]. A tiny current (coulombs/second) from this internal collection then flows for a finite time through the resistance of the voltmeter. So you dissipate (joules/coulomb) x (coulombs/second) x (seconds), which gives a

certain amount of energy dissipated as work in moving the needle of the voltmeter. The voltmeter is calibrated so that it effectively indicates the collected energy per coulomb that was dissipated, and it calls that entity voltage.

It involves a finite amount of energy that has already been dissipated as work, and it's a measure of the local energy density of the potential in terms of joules/coulomb. It is not a measure of the potential proper. It's after the fact; the extracted (collected) potential gradient it actually refers to existed in the past, before the work (dissipation of the collected trapped energy) was done. To refer to the potential before its dissipation as "voltage" is precisely the same as confusing the future with the past. A "potential (difference) of so many volts" is actually a statement that "a potential difference of so much energy per coulomb" could be dissipated in a load, if it were connected to the load so that a finite amount of energy was collected, and this finite load-collection was allowed to dissipate as power (volts/coulomb x coulomb/sec) for a finite time, yielding work. It's even worse, but it would take a textbook to straighten out this one error in EM theory.

So we'll leave it at that, and we'll adapt the notion of potential the way it is corrupted in electrical circuit theory. There it's used not really as energy, but rather as excess energy per coulomb of potentialized charge. I apologize for that difficulty, which is not of my own making, but I must use the conventional notion if we are to greatly clarify the pseudo equations.

The Equations of Free Energy

The Pseudo-Equations:

Let us use the following subscripts and letter convention, and develop the nomenclature needed:

T = trapped d = dissipated or dissipating

m = translated (moving) K = energy

V = volts = potential drop (potential dissipated) = previously collected potential radiated away as heat in a load, doing work on the load in the process. Unfortunately, we shall also have to speak of a potential gradient that is not being dissipated, so we shall have to speak of "trapped volts" which is erroneous, but complies with the common usage.

f = electrostatic scalar potential. Coul = coulombs

i = amperes = Dissipating potentialized coulombs per second flowing, so amps are something translating, always. Amps are excited coulombs, per second, that are dissipating their excitation. With superconductivity excluded, you only have amps when you have a potential drop across a load. So we will speak of amps as "dissipating," meaning that potentialized electrons are traveling through a load, dissipating their activation (gradients) in the load by radiating scattered photons (heat).

n = number of electrons in a coulomb = 6.3×10^{18} electrons/coulomb

Here are the pseudo equations (superconductivity is excluded):

ampm = coul/sec = n electronsm/sec = n electronsd/sec [1]

Df = VT (as conventionally referred to). It would be volts if all [2] of it were dissipated, but it is not yet dissipated, so it is sort of "trapped volts". Erroneous, but the common use. So we will speak (somewhat distastefully) of "trapped volts" and "dissipated volts."

Vd x ampd x sec = watts x sec = power x time = work = Kd [3]

Vd x coul/sec x sec = (work) = Kd [4]

In the switching, we switch KT to Kd so

KT \rightarrow Kd [5]

But VT x coulT = KT [6]

Or

$[VT] = [KT] / [\text{coulT}] = \text{trapped energy/trapped coulomb [7]}$

$[KT] = [VT] \times [\text{coulT}] = \text{amount of trapped energy, each cycle [8]}$

So that's what we were getting at. The amount of trapped energy you can transfer (in other words, how much coal you get in one shovelful) depends upon the number of trapped electrons you have in the trapped free electron gas in the collector, and the potential gradient you apply to those trapped coulombs to potentialize them.

Relaxation Time and Semiconductors

Relaxation Time:

The time it takes for the free electrons in a conductor (or material) to reach the skin of the wire after potential is applied, is, of course, called the relaxation time. During that time, the free electrons in the gas are "trapped" insofar as producing current (dissipation of the potential) is concerned. However, immediately after the relaxation time ends, current begins and dissipation of the trapped energy begins.

In copper, the relaxation time is incredibly rapid. It's about 1.5×10^{-19} sec. However, in quartz it is about 10 days! So as you can see, we need to get somewhere in between these two values, and so we will have to "mix" or "dope" materials. We must get a sufficiently long relaxation time so that we can switch and collect comfortably in cycle one, then switch into cycle two for dispersion of the freely collected energy in the collector. However, the relaxation time we get must also be short enough to allow quick discharge in the load, as soon as we switch the primary source away from the collector. Actually, we need a degenerate semiconductor material instead of plain copper.

Degenerate Semiconductor Material:

A semiconductor material is intermediate between a good conductor and an insulator. It's a nonlinear material, and doped. A degenerate semiconductor material is one which has all its conduction bands filled with electrons, and so it thinks it is a conductor. That is, a degenerate semiconductor is essentially a doped conductor, so to speak. As you can see, we can increase the relaxation time in our "conductors" connected to the source by making them of degenerate semiconductor material. What we're talking about is "doping" the copper in the wire, and in the collector, so that we can have plenty of time to collect, and switch, and discharge, and switch, and collect, etc.

Now in a doped conductor (degenerate semiconductor), we can tailor the relaxation time by tailoring the doping. We must dope the copper before we make the wire. Why would we wish to do that? We want to overcome the single problem that so far has defeated almost all the "overunity" researchers and inventors.

WHEN YOU CONNECT TO A SOURCE, YOU CAN ONLY EXTRACT CURRENT-FREE POTENTIAL -- FREE "TRAPPED EM ENERGY" -- DURING THE ELECTRON RELAXATION TIME IN THE CONNECTING CONDUCTORS AND SUCCEEDING CIRCUIT COMPONENTS. AFTER THAT, YOU'RE STEADILY EXTRACTING POWER, AND THE ENERGY EXTRACTED FROM THE SOURCE IS BEING PARTIALLY DISSIPATED IN THE RESISTANCE/LOADING OF THE CIRCUIT, AND PARTIALLY DISSIPATED IN THE INTERNAL RESISTANCE OF THE SOURCE. IN THE LATTER DISSIPATION, YOU'RE ALSO DISSIPATING YOUR SOURCE BY DOING WORK ON IT INTERNALLY TO KILL IT.

Good Copper Wire:

Bane of Overunity Inventors: Many destitute inventors, tinkering and fiddling with overunity devices, finally get something (a circuit or device) that does yield more work out than they had to input. At that point, they usually conclude that it's simply the specific circuit configuration and its conventional functioning that produces the overunity work. However, usually as soon as this configuration is more carefully built with very good materials, boom! It isn't overunity anymore. The inventors and their assistants then desperately bang and clang away, getting more frustrated as the years pass. The investors get mad, sue for fraud, or get in all sorts of squabbles. The scientists who tested it and found it wanting, pooh-pooh the whole thing as a scam and a fraud, or just a seriously mistaken inventor. Scratch one more "overunity" device.

Most of these inventors got their successful effect (and possibly erratically) when they were struggling with inferior, usually old, usually corroded materials. Actually, the more inferior, the better. The more contaminated/doped, the better!

The moment you wire up your circuit with good copper wire connected between the battery or primary source and any kind of load including the distributed circuitry loading itself, you can forget about overunity. You will lose

it in the copper, after the first 1.5×10^{-19} second!

Think of a really good conductor such as copper as an essentially linear material. Linear means energy conservative. Overunity can only be done with a highly nonlinear effect. So your "conductors" have to be made of nonlinear materials. In fact, they have to be made of degenerate semiconductor material. For the type of circuitry we are talking about, the copper has to be doped and then made into "doped copper" wiring. You also have to utilize the primary battery only to potentialize a collector (secondary battery/source), and then use this secondary battery source to conventionally power the load while also killing itself.

The Wiring And the Collector Must Be of Degenerate Semiconductor (DSC) Material.²⁶

A good materials scientist/engineer, together with a decent electrodynamicist, can readily design and tailor some doped copper wiring so that the material in the wiring is a degenerate semiconductor material, with a target (desired) relaxation time. That's what you should use to make the wiring to connect up your source to the collector with, and that type of material is also what you use in your collector. You can use either a coil or a capacitor as the collector, but its "conductive" material has to be degenerate semiconductor material -- in short, it must be doped to have the proper relaxation time. From the collector to the load, however, obviously you want to use a good conductor material. Ordinary copper will do nicely there.

Once you do that, you're in business. When making the DSC material, simply tailor the relaxation time to something which is easily switched. For example, take one millisecond. With a relaxation time of that long, switching is easy. In fact, one could even use good mechanical switching. Or easily use inexpensive ordinary solid state switching, without having to go all the way to nanosecond switching.

Then, in the collector, you calculate the number of "trapped coulombs" you have. Take the "trapped voltage" (current-free potential's energy density per coulomb) you extract from the source during the electron relaxation time after the collector is connected. Multiply the number of trapped coulombs in the collector by the trapped voltage during collection, and you have the amount of energy in joules that you extract FOR FREE, without paying for it, from the source during every collection cycle.

Sources, Collectors, and Power

Tapping Vacuum Energy.

You're getting the excess electrical energy directly from the vacuum, as we briefly pointed out above. The vacuum will freely replenish all the "trapped voltage" you extract from the primary source during the electron relaxation time. It won't replenish a single bit of "dissipated voltage" (power) you extract from the source.

Note that the same considerations apply in the collector. It's got to have a somewhat longer electron relaxation time. Its electrons stay "unrelaxed" during the collection cycle, and allow for some additional switching time to connect to the load. The "trapped voltage" across the collector multiplied by the number of trapped coulombs in it, gives the number of joules of FREE EM ENERGY you extract and get into and onto the collector (the shovel). In other words, that's your "shovelful of coal." You then throw the "shovelful" onto the fire/load -- you simply disconnect the collector from the primary source and connect it across the external load. The collector (secondary battery) now powers the load and its own internal resistance, "killing" itself while furnishing the energy for powering the external load as well.

The Source Can Be Almost Anything:

You can use as a source a simple elevated wire, to "tap" potential from the 200-300 volts/meter between earth and ionosphere. Here again, you need to utilize calibrated, doped wire.

Finally, you must adjust the repetition switching in accordance with the discharge time through the load. In other words, you have a serial process as follows:

- (1) extract trapped energy (potential) from the source onto the collector, Δt_1
- (2) Switch the collector off the source, onto the load, during time Δt_2
- (3) Wait while the collected energy in the collector discharges through the load, during time Δt_3
- (4) Switch the collector back off the load and onto the potential source, during time Δt_4 . That completes one cycle

The serial timing simply is $[\Delta t_1 + \Delta t_2 + \Delta t_3 + \Delta t_4]$.

If you balance all the doping and the materials design, and correlate the switching, you can get all the free

energy you wish. Properly utilized, a single car battery can be used to power an electric automobile indefinitely. Or even to power a battleship. In the real world, of course, you will inevitably have a tiny bit of loss as you go, because there's a finite (though high) resistance between the two poles of your battery. Handling that is a piece of cake. Simply run a separate little collection circuit to collect a little bit of trapped EM energy from the slowly leaking source, and ever so often feed the collected energy back into the battery as power, to "reparate" the charges (charge the battery) and replace the small amount of the primary source's potential gradient that has been lost. The battery, load, and "trickle charger" then become a closed-circuit free-energy source that will last for years and years.

Limited Only By One's Imagination:

Of course you can see many variants; this is just the "master key." You can have multiple collectors, collecting trapped energy simultaneously or in sequence off a single source, and pooling their collected energy to more powerfully power the load. You can utilize a very high "voltage", such as in the Swiss electrostatic overunity device, to increase the energy collected per coulomb in each switching (in each shovelful) in accord with equation [8]. For a battery, you can set a separate little collector/load device to trickle-charge the battery, overcoming the small normal "leakage current" that does occur in batteries and in real circuits and devices. The opportunities are endless. You can put in a unit to take mostly only power-free energy from the "power line" feeding your business or home, reducing your utility bill by -- say -- 90%. Or you can simply build a small home power unit to do the whole job, for only a few hundred dollars. This simple secret can be used to power the world, cheaply and cleanly, and to clean up the biosphere.

Conclusion

Well, there you have it. I've given you the benefit of what required most of my adult life to discover. The definitions advanced in this paper are rigorous. It took years of sweat and tears to come up with them. They're simple, but they will change your entire understanding of electromagnetics, power, and energy once you grasp them. Please read them, and ponder them, several times. One or two readings will not be sufficient to fully grasp what is said here.

Also, hopefully, by this time, the reader is beginning to experience the same emotions as I experienced when I finally discovered how simple it all really was. First one wants to laugh for about two hours at how truly ignorant we've all been. Then one wants to cry for about two hours for the same reason. This could all have been done a century ago, if we had ever really understood electromagnetics.

We've had this electromagnetics around for over 100 years -- Maxwell's book was published in 1873. We got it wrong, starting right with Maxwell and his use of the material ether, which was almost universally assumed at the time. Still, by using quaternions, Maxwell succeeded in packing a great deal more in the model than even he himself recognized. When the vector aspects interacted to form a zero resultant translationally, those active interactants were still in there and still fighting and interacting. The scalar component of the quaternion remained, and infolded those struggling vectors and functions of them inside itself. In short, it captured the case where the electromagnetic energies are involved in translation actions which nullify each other translationally (electromagnetically). However, the energies are still in there in the continuing interactants inside the zero vector resultant. As such, they are trapped EM energy. And it is the trapped EM energy inside a mass -- not the mass per se -- which is responsible for gravitation. In other words, Maxwell's theory already correctly captured the unification of the gravitational field and the electromagnetic field in 1873.

Then Heaviside et al forced Maxwell's theory into a vector framework, throwing out the scalar component, and discarding the unification of gravitation and electromagnetics along with it. Serious errors were made and still exist in many of the fundamental definitions; in fact, many of them aren't definitions at all. Nearly every engineer and physicist can readily calculate potentials -- all, of course, on the "dissipation" side where the potentials are actually the amount of potential that was collected upon a collector and then dissipated. I could find hardly a single physicist who really knew what a scalar potential was prior to a finite amount being collected and dissipated as voltage. Yet 99% of them firmly believed they understood the potential.

So now you have the results of this researcher's long and arduous quest for the golden fleece. Please go forward with it, to make this a better and cleaner world for everyone.

Just remember that the control and use of energy is personal power. The control and use of absolute energy is the control and use of absolute personal power. In the old adage, power corrupts and absolute power corrupts absolutely.

Please use it wisely.

NOTES AND REFERENCES

1. For a good discussion of the modern quantum mechanical view of the vacuum, see I. J. R. Aitchison, "Nothing's plenty: the vacuum in modern field theory," *Contemporary Physics*, 26(4), 1985, p. 333-391. See also T. D. Lee, *Particle Physics and Introduction to Field Theory*, Harwood Academic Publishers, New York, 1981 -- particularly Chapter 16, "Vacuum as the source of asymmetry." See Timothy Boyer, "The classical vacuum," *Scientific American*, Aug. 1985, p. 70; Walter Greiner and Joseph Hamilton, "Is the Vacuum really Empty?", *American Scientist*, Mar.-Apr. 1980, p. 154; Jack S. Greenberg and Walter Greiner, "Search for the sparking of the vacuum," *Physics Today*, Aug. 1982, p. 24-32; Richard E. Prange and Peter Strance, "The superconducting vacuum," *American Journal of Physics*, 52(1), Jan. 1984, p. 19-21; R. Jackiw and J.R. Schrieffer, "The decay of the vacuum," *Nuclear Physics B*, Vol. 190, 1981, p. 944. See Paul Davies, *Superforce*, Simon and Schuster, 1984 for a layman's overview of modern physics, including the modern view of the vacuum.

2. E. T. Whittaker, "On the partial differential equations of mathematical physics," *Mathematische Annalen*, Vol. 57, 1903, p. 333-355. Since the scalar potential actually consists totally of a set of hidden bidirectional EM waves, then scalar interferometry is possible, and not just an oxymoron as it would seem without considering the inner wave structure of the scalar potential. Two scalar potentials (each of which is a multi-wave set) can interfere; it is just a special kind of multiple wave interferometry between their internal wave compositions. This is a major point of profound impact on physics. Whittaker in fact showed that all classical EM could be replaced by such scalar EM potential interferometry. See E. T. Whittaker, "On an expression of the electromagnetic field due to electrons by means of two scalar potential functions," *Proceedings of the London Mathematical Society*, Series 2, Vol. 1, 1904, p. 367-372. Further, scalar interferometry has been proven; today it is called the Aharonov-Bohm Effect. See Y. Aharonov and D. Bohm, "Significance of Electromagnetic Potentials in the Quantum Theory," *Physical Review*, Second Series, 115(3), Aug. 1, 1959, p. 458-491. For confirmation and discussion, see Bertram Schwarzschild, "Currents in normal-metal rings exhibit Aharonov-Bohm Effect," *Physics Today*, 39(1), Jan. 1986, p. 17-20. For an extensive discussion of the Aharonov-Bohm effect and an extensive list of references, see S. Olariu and I. Iovitzu Popescu, "The quantum effects of electromagnetic fluxes," *Reviews of Modern Physics*, 57(2), April 1985. Modern scientists have generally been unaware of the inner wave structure of the interfering potentials and have utilized only quantum mechanical theory for the interference. Consequently, they have been able to experimentally establish the AB effect for only a few thousand Angstroms distance. With the Whittaker formulation, the AB effect becomes distant-independent, because the necessary potentials can be fabricated as laser-like beams, simply by assembling the proper Whittaker multibeam set. Also, Ignatovich pointed out that the Schroedinger potential can also be decomposed into just such an internal bidirectional EM wave set. See V.K. Ignatovich, "The remarkable capabilities of recursive relations," *American Journal of Physics*, 57(10), Oct. 1989, p. 873-878.

3. See Richard W. Ziolkowski, "Exact Solutions of the Wave Equation With Complex Source Locations," *Journal of Mathematical Physics*, Vol. 26, 1985, p. 861; "Localized Transmission of Wave Energy," *Proc. SPIE*, Vol. 1061, Microwave and Particle Beam Sources and Directed Energy Concepts, 1989, p. 396-397; "Localized Transmission of Electromagnetic Energy," *Physical Review A*, Vol. 39, p. 2005; "Localized Wave Transmission Physics and Engineering," *Physical Review A*, 1992, (in Press); "Localized wave transmission physics and engineering," *Proc. SPIE Conference on Intense Microwave and Particle Beams II*, Los Angeles, CA, vol. 1407, Jan. 1991, p. 375-386. See Richard W. Ziolkowski, Amr M. Shaarawi, and Ioannis M. Besieris, *Nuclear Physics B (Proc. Suppl.)*, Vol. 6, 1989, p. 255-258; R.W. Ziolkowski, and D.K. Lewis, D.K., "Verification of the Localized Wave Transmission Effect," *Journal of Applied Physics*, Vol. 68, 1990, p.6083; Richard W. Ziolkowski, Ioannis M. Besieris, and Amr M. Shaarawi, "Localized Wave Representations of Acoustics and Electromagnetic Radiation," *Proceedings of the IEEE*, 79(10), Oct. 1991, p. 1371-1378; I.M. Besieris, A.M. Shaarawi, and R.W. Ziolkowski, "A bidirectional travelling plane wave representation of exact solutions of the scalar wave equation," *Journal of Mathematical Physics*, 30(6), 1989, p. 806; A.M. Shaarawi, I.M. Besieris, and R.W. Ziolkowski, "A novel approach to the synthesis of nondispersive wave packet solutions to the Klein-Gordon and the Dirac equations," *Journal of Mathematical Physics*, 31(10), 1990, p. 2511; "A nondispersive wave packet representation of photons and the wave-particle duality of light," UCRL-101694, Lawrence Livermore National Laboratory, Livermore, CA, 1989; "Diffraction of a classical wave packet in a two slit interference experiment," UCRL-100756, Lawrence Livermore National Laboratory, Livermore, CA 1989; "Localized energy pulse trains launched from an open, semi-infinite, circular waveguide," *Journal of Applied Physics*, 65(2), 1989, p. 805; R.W. Ziolkowski, D.K. Lewis and B.D. Cook, "Experimental verification of the localized wave transmission effect," *Physical Review Letters*, 62(2), 1989, p. 147; R.W. Ziolkowski and D.K. Lewis, "Verification of the localized

wave transmission effect," *Journal of Applied Physics*, 68(12), 1990, p. 6083; M.K. Tippet and R.W. Ziolkowski, "A bidirectional wave transformation of the cold plasma equations," *Journal of Mathematical Physics*, 32(2) 1991, p. 488; A.M. Vengsarkar, I.M. Besieris, A.M. Shaarawi, and R.W. Ziolkowski, "Localized energy pulses in optical fiber waveguides: Closed-form approximate solutions," *Journal of the Optical Society of America A*, 1991.

4. For a precise statement of the distortion correction theorem, see Amnon Yariv, *Optical Electronics*, 3rd Ed., Holt, Rinehart and Winston, New York, 1985, p. 500-501.

5. Both wave and antiwave co-exist in the vacuum simultaneously, forming a stress wave. The entity that is stressed is the rate of flow of time. In the common interaction with matter, the time-forward half of the stress wave normally interacts with the electron shells of the atom, giving electron translations forces. The time-reversed or anti-wave half interacts with the nucleus, giving the Newtonian 3rd law reaction (recoil) forces. The so-called "EM wave" in vacuum is a gravitational wave. It is a wave of oscillation of the rate of flow of time. It is rather like a sound wave in air, as Tesla pointed out, and it is a longitudinal wave, not a transverse "string" wave.

6. As pointed out by Nikola Tesla. Tesla was correct, and all the textbooks with their transverse "string" waves are in error. There are no strings in the vacuum!

7. E.g., see Clayton R. Paul and Syed A. Nasar, *Introduction to Electromagnetic Fields*, 2nd Ed., McGraw-Hill, New York, 1982, p. 113.

8. E.g., see Clayton R. Paul and Syed A. Nasar, *ibid.*, p. 100-101. See also Raymond A. Serway, *Physics For Scientists And Engineers, With Modern Physics*, Saunders College Publishing, Philadelphia, PA, 3rd Ed., Updated Version, 1992, p. 752-755.

9. Sommerfeld's theory of metallic conduction was based on Drude's concept that the outer valence electrons of a conductor, which do not form crystal bonds, are free to migrate through the crystalline lattice structure, and so to form an electron gas. At room temperature, by quantum mechanical considerations, these free electrons are moving randomly, but at an average velocity on the order of 106 meters per sec. E.g., see Martin A. Plonus, *Applied Electromagnetics*, McGraw Hill, New York, 1978, p. 54-58, 62-3, 376-7. If you wish to know just how much power exchange is driving the collisions of the electron gas in a copper wire, here is an illustration. In one cubic centimeter of copper wire, the power exchange in and out of the electron gas is some 4 billion billion watts. That's the equivalent of 4 billion large electric power plants, each of 1,000 megawatt capacity. And one cubic centimeter of copper is a lump about the size of the end of our little finger.

10. E. g., see Raymond A. Serway, *ibid.*, p. 743-744 for a discussion and calculation of the electron drift velocity in copper.

11. Richard P. Feynman, Robert B. Leighton, and Matthew Sands, *The Feynman Lectures on Physics*, Addison-Wesley, New York, Vol. 1, 1963, p. 2-4. In the classical EM theory launched by Maxwell and later modified by Heaviside et al, this problem did not exist for the original theoretical formulation. In that formulation by Maxwell, and continued by Heaviside, a material ether is assumed for the model. The Michelson-Morley experiments of 1887 destroyed the notion of the material ether, but the classical electromagnetics model has never been corrected to rectify its very serious foundations flaw in this respect.

12. Robert Bruce Lindsay and Henry Margenau, *Foundations of Physics*, Dover Publications, New York, 1963, p. 283-287. Note on p. 283 that a "field of force" at any point is actually defined only for the case when a unit mass is present at that point. In spite of this, most classical electrodynamicists continue to adhere to the notion that the EM field exists as such in the vacuum, but do admit that physically measurable quantities such as force somehow involve the product of charge and field. E.g., see J.D. Jackson, *Classical Electrodynamics*, 2nd Ed., John Wiley & Sons, New York, 1975, p. 249. Note that holding such a concept is tantamount to holding on to the material ether, and assuming that the vacuum itself is "measurable" or "observable."

13. The formula $F = ma$ is simply an algorithm for calculating the magnitude of the force. It states that "the magnitude of the force is equal to the magnitude of mass that is accelerating, multiplied by the magnitude of the acceleration." No such "equals" formula is a definition; it is only a calculational algorithm.

14. This falsifies one of the assumptions in the common notion of the scalar potential; that its gradient in vacuum is a force field. Let us falsify another part of the conventional concept of the potential. Take the notion of forcibly pushing in "against the field" of a trapped charge, a unit charge from infinity. At any point you stop, the

work n you have done on the unit charge is equal to the value of the potential, so it is said. Actually, you pushed in a one-coulomb collector, and have collected and dissipated as work n joules of energy on that one coulomb. In other words, the energy density of the potential there, if collected and dissipated on a collector, is n , where n is joules per coulomb (NOT joules!). To prove it: suppose we go out on 10,000 radials from that point, and push in from infinity 10,000 unit charges from infinity. Then, the total work done "against the potential gradient ("field", in common language) is now 10,000 n . This makes no sense at all from the conventional view (which carefully refrains from multiple collectors!). It makes good sense from our view of the potential as having infinite energy but a finite energy density. In that case, the more collectors, the more energy collected, for dispersal as work.

15. For a discussion, see Y. Aharonov and D. Bohm, 1959.

16. Nikola Tesla, "The True Wireless," *Electrical Experimenter*, May 1919, p. 87.

17. The power in the load is always the time rate of dissipation of energy that has just been freely collected by the load for dissipation.

18. One can foresee a day in the not too distant future when any power company continuing to do such an unthinkable thing will have a class action suit brought against it by its customers!

19. T. E. Bearden, "Mechanism for Long-Term Cumulative Biological Effects of EM Fields and Radiation," March 1993 (in preparation).

20. Precisely analogous to a heat pump's operation - which as is well-known can readily be "over unity" in its efficiency. The maximum efficiency of the heat pump is about 8.22. E.g., see David Halliday and Robert Resnick, *Fundamentals of Physics*, 3rd Edition Extended, John Wiley and Sons, New York, 1988, Volume 1, p. 510-519. Good heat pumps normally have about 4.0 efficiency.

21. External power in an electric circuit refers to the dissipation rate (in the circuit's external load) of the potential gradients on the activated/potentialized electrons. Internal power refers to the dissipation rate in the circuit's bipolarity source.

22. We call strong attention to T.W. Barrett, "Tesla's Nonlinear Oscillator-Shuttle-Circuit (OSC) Theory," *Annales de la Fondation Louis de Broglie*, 16(1), No. 1, 1991, p. 23-41. In this important paper, Barrett shows that a higher topology EM, such as quaternion EM, allows many things to be accomplished with circuitry that are not apparent to a conventional vector or tensor analysis of that circuitry. He also shows the Nikola Tesla's circuits accomplished this higher topological functioning.

23. It is easy to test this. Connect several different wires to a single source of potential gradient. With respect to ground, the end of each one of those wires has the same potential gradient as does the original source with respect to ground. If you connect 10 wires to a single "100-volt" potential gradient source, you will have ten 100-volt potential gradients appear. You can use each of these ten potential gradients as a primary source. From each of these new primary sources, you can branch ten more, and now have a hundred potential gradient sources. You can treat each of these hundred new sources now as a primary source. To each one, you can add a switcher, collector, and external load, and drive all 100 loads. Or instead, you can put ten switcher/collector/external load circuits with each of the hundred new primary sources, and power all 1,000 external loads. Energy/potential is free from any source, so long as you do not demand power from the same source.

24. Per Whittaker and Ziolkowski, this VPF exchange -- from consideration of its wave aspects -- consists of a harmonic series of bidirectional waves.

25. We are easily permitted to have free energy and violate the "local energy conservation law for a closed system." This is because the system is not closed, and so instead we must apply local energy conservation for an open system with a hidden source. In any given time interval, the energy taken (scattered) from the system as external work cannot exceed the sum of the unscattered trapped energy that was in the system initially and the unscattered energy that flowed into the system during that time interval.

26. You can actually do away with the separate collector, and utilize the doped copper DSC material itself as the collector. However, you will not be able to collect nearly so much energy in each collection cycle, for dissipating in the load in the subsequent work cycle.

Part II

Additional Comments and Information

ADDITIONAL COMMENT: March 12, 1993

The present classical CEM model prescribes closed, energy-conservative type systems. If any electrical device works totally according to the accepted CEM model, it cannot and will not ever produce overunity. Simply put, you have excluded any hidden EM source that is freely replenished, and you have assumed continual killing of all energy input sources utilized. On the other hand, if one takes the view that the overunity electrical machines are possible after all, then -- whether one is consciously aware of it or not -- one has implied that classical CEM must somehow be substantially flawed. If it's flawed, then -- being a model -- some of its primary assumptions (postulates) and/or fundamental definitions must be in error. The proper place to go after "free electrical energy" is to rigorously examine CEM, over and over, until flaws are uncovered which allow a hidden, freely replenished source of input energy. In other words, one must find a way to "open" the electrical system to an inflow of energy from this source, without closing off the source. Until one finds such an "extension" of CEM, one has no model or concept which can reasonably be expected to provide overunity electrical energy output. Note also that, while the majority of the EM circuitry of an electrical overunity machine may obey CEM, at least one section -- where the source is freely tapped and the excess energy extracted -- must violate CEM.

I have spent many arduous years in this very process, right or wrong. The bottom line of my search is this: the only verified (by Whittaker and Ziolkowski) (WZ) "freely replenished river" of EM energy, that can act as the required "free energy" source for input to the would-be overunity electrical system, is the potential. But to understand the potential, completely new definitions are required for many entities, among them being energy, electrical charge, electrostatic scalar potential, voltage, etc. The present so-called "definitions" of these entities in CEM are either non-existent, entirely wrong, or quite unsatisfactory.

So far, the search has uncovered two major ways to tap the continually-replenished EM energy in the scalar EM potential:

(1) use of the inner WZ internal biwave structure of the potential as pump waves on/to a nonlinear material (such as the atomic nucleus), so that the nucleus becomes a pumped phase conjugate mirror. Then, by normal phase conjugate optical theory, simply inputting a small signal wave will produce an amplified phase conjugate replica (PCR) wave emitted from the mirror material, and this PCR will precisely backtrack the original input signal wave's path (see the distortion correction theorem) back out of the nucleus, out of the atom, and into the external circuit. There, the amplified PCR wave can be "filtered off" and sent to the external load, to power the load. The Floyd Sweet vacuum triode works precisely by this mechanism. Note particularly that Barrett has shown that higher topology EM (such as the original quaternion EM theory) can accomplish such "optical functioning" without the use of optical materials. To do Sweet's vacuum triode type process is thus theoretically possible with electrical circuitry alone, but one must have more than the current understanding of CEM, as Barrett pointed out. In other words, one can "open" any 4-space system by adding hyperspace (or subspace, if one insists on retaining Minkowski 4-space). One can thus have a hyperspatial source. Indeed, Ziolkowski and others have already pointed out that the WZ type decomposition of the scalar potential is essentially equivalent to having complex sources.

(2) The second way is to "trap the electron gas electrons" in a separate collector, feed "current-free potential" to the collector from a primary battery or other source of potential, and collect a bunch of excess energy (potential) in the collector's "penned up free electron 'horses'" waiting to carry the excess energy to the load and dissipate it there, once they have been released. Then, one switches the primary potential source away from the collector, while the "energy-loaded horses" are still trapped and straining at the bit, so that no work can be done -- by those agitated horses when they stampede out of there -- on the internal resistance of the primary source, to destroy or reduce it. In the same switching action, the collector with its "snorting but still trapped electron horses" is switched across the load to form a totally separate circuit with it, having nothing at all to do with the original primary source of potential. Then, the agitated horses are released, and thunder out through the load, scattering their riders (excess energy) in all directions in the load, producing work/heat and powering the load. They will also charge on around to the reverse side of the collector, and kill its charge separation (kill its potential) as well, just as does any ordinary circuit.

The major disadvantage of method 1, as we presently have seen it done (however, check Barrett's demonstration that Tesla's patented circuitry is capable of doing it by circuitry alone), is that time-reversed electrical energy is produced. So Method 1 has some serious drawbacks. "Time-reversed energy stuff", which should stay in the atomic nucleus as Newtonian 3rd law reactions and 3rd-law energy exchanges, is dragged out. Unusual effects on biological systems can occur. Antigravity effects can occur. Other hidden processes in the universes, that affect the atomic nucleus, can be gated into the external circuitry, causing disaster. Monopoles can be deposited in the magnets, causing them to explode like hand grenades. Most of the new "massive time-reverse energy" phenomenology is still unknown. One cannot at this stage of ignorance adequately guarantee human safety. I presently don't see just how this kind of energy can pass an Underwriter Laboratories' testing and certification, until a lot more exhaustive work is done to understand the new phenomenology.

Method 2, however, yields ordinary, garden-variety, positive-time electrical energy. The method presented in the paper is my own discovery. No unusual time-reversed phenomena are involved. It would appear to be eminently practical to produce and certify power units based on Method 2. The phenomenology and risks are the same as for ordinary, time-forward power systems.

Method 2 has another unique characteristic: as a system, all the subsystems are already in the literature and validated. They have just not previously been put together in this fashion. So development of the system really represents an "integration" problem only, after one first does a little development of a proper degenerate semiconductor material (DSM). In other words, one first develops (and tests) the exact doping materials and percentage, to get a DSM material that is still a good conductor but has a relaxation time of -- say -- one tenth of a millisecond. One builds the wires from the battery to the collector out of this new DSM material. If one uses a capacitor for the collector, the plates must be made out of the new DSM material, not out of normal "pure conductor" material. Then one develops a switcher that switches in one tenth (or less) the relaxation time of the DSM, or in this case in one hundredth of a millisecond. That switching time, of course, is easy for any decent electronic technician or electronic engineer. One also develops a timing circuit that will,

- (1) sense the status of the discharge of the collector energy through the load
- (2) trigger the switching at the correct times so that a smooth two-cycle (collect, discharge) process results

Note that the lengths of cycle one and cycle two are not necessarily equal at all. One may use multiple collectors/loads simultaneously, cascaded collectors/loads, etc. Hundreds of variations are possible and feasible.

It is not possible to do anything with this discovery in a normal manner. I would dearly like to be economically independent, so I could work full time in my efforts on free energy, antigravity, extended EM healing, cancer, etc. Many orthodox scientists will also fiercely resist this upstart notion of "overunity" electrical machines to the bitter end. When powerful economic interests realize one has such thing for real, one is certainly going to be stopped, jailed, or killed, or he may just "mysteriously vanish" and never be seen again.

So I just freely released and distributed my discovery of method 2, in the paper "*The Final Secret of Free Energy*". It is deliberately targeted toward technicians, junior engineers, and educated laymen. (The principles and definitions raised, however, can be debated to the nth degree by knowledgeable foundation scientists). The paper has already been distributed worldwide. Now the principles and definitions are available to everyone. If they are in error, shortly that will be proven in spades. If they are correct, that will also be established shortly.

Anyone who wishes can develop and patent a particular application. There's no longer any way to stop this information from being disseminated and utilized. I hope that a flurry of development and patenting activity will result around the world. Get cheap, clean electrical energy to everyone. Bring on the electric auto, clean up the noxious auto exhausts, get rid of giant oil spills, and clean up the biosphere.

Additional Information - Update 15 February 1994

On The Final Secret of Free Energy

Introduction

My associates and I have filed the first patent application on two electrical overunity processes and devices; one similar to what is outlined in *The Final Secret of Free Energy* ^[Ref 1] and an additional variation utilizing, as collectors, standard step-charged capacitors rather than degenerate semiconductor materials. In 60 to 90 days, we will have a very enlightening paper (more likely a book) ready on that. We also plan to file several more

extremely fundamental overunity patent applications from additional phenomena and mechanisms that we have uncovered.

In this paper, it is assumed that the reader is familiar with the content of *The Final Secret of Free Energy*. Figure 1 shows the invention schematically, and we briefly summarize it as follows:

Summary of the Invention

A method and apparatus for extracting bidirectional EM wave energy from the vacuum through the scalar potential gradient across the terminals of an electrical source, collecting the excess energy in a collector without entropy, then separately discharging the collected energy through a load to perform work, without sending the load current back through the primary source against its potential gradient; i.e., against its back emf. Removing the load current from the source thereby substantially reduces the production of work inside the source to dissipate its bipolarity; said internal dissipative work being well-known to be the cause of exhaustion of the source's ability to continue to furnish emf to the external circuit.

By reduction of its internal dissipation, the source is enabled to furnish more energy for dissipation in the external load than is utilized to dissipate the source internally. Hence the source is enabled to operate with an overunity operational efficiency. The system permissibly operates as an "open" system, and extracts and utilizes excess EM energy from a free-flowing external source (the flux exchange between the surrounding vacuum and the bipolarity of the source), hence it can operate at an efficiency greater than unity without violation of the laws of physics, in a manner analogous to but entirely different from a heat pump. In this invention, it is not the purpose of the primary source to furnish current and dissipative power to the external circuit.

The bipolarity of the source is utilized primarily as a dipole antenna to receive the bidirectional EM wave energy flow from the vacuum, and direct it without entropy through a switching unit to the collector. Conduction electrons in the collector are temporarily restrained while being overpotentialized by the excess energy being collected upon them. The collector and its overpotentialized electrons are then switched away from the primary source, and connected across the load as a separate circuit and closed current loop. The electrons in the collector and their excess energy are then automatically released to flow as current discharge through the load, releasing their excess energy to perform useful work in the load.

The collector is then switched away from the load and back across the primary source, and another collection cycle is initiated. Iteration of the collection and discharge cycles provides power to the load. Additional collection and smoothing capacitances for smoothing the iterations and furnishing steady power to the load may be added as desired. The invention violates the closed circuit practice of powering loads, but does not violate the conservation of energy law, the second law of thermodynamics, or any of the other known laws of physics.

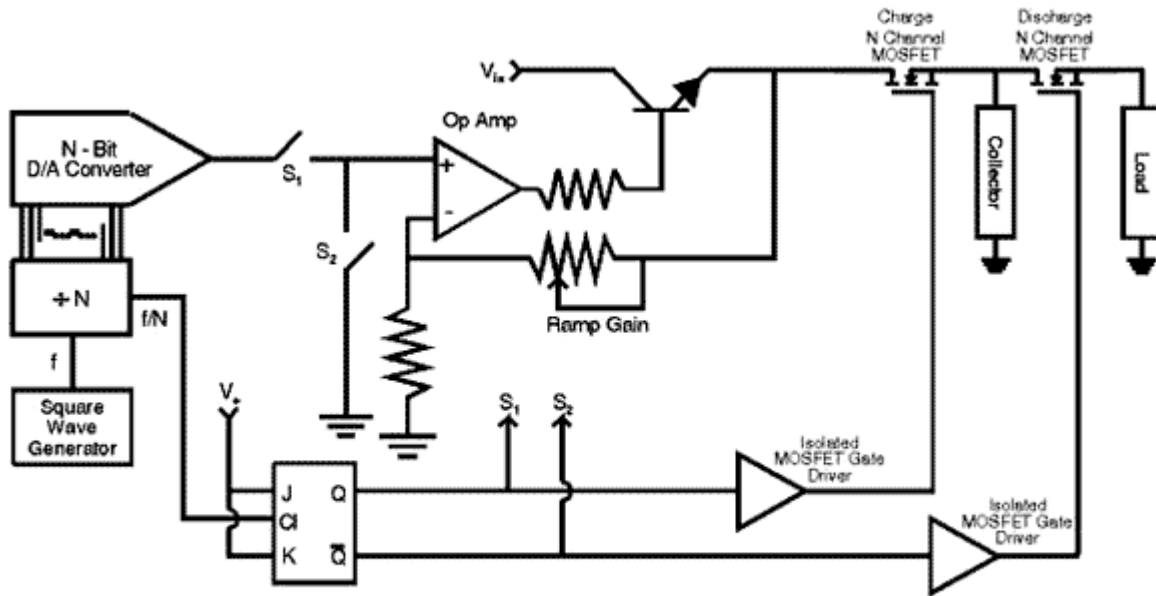


Figure 1A

Figure 1a. Type circuit utilized for ramp-up charging of a capacitor without work, and separate discharge of the collected energy in the load without substantial depletion of the primary source.

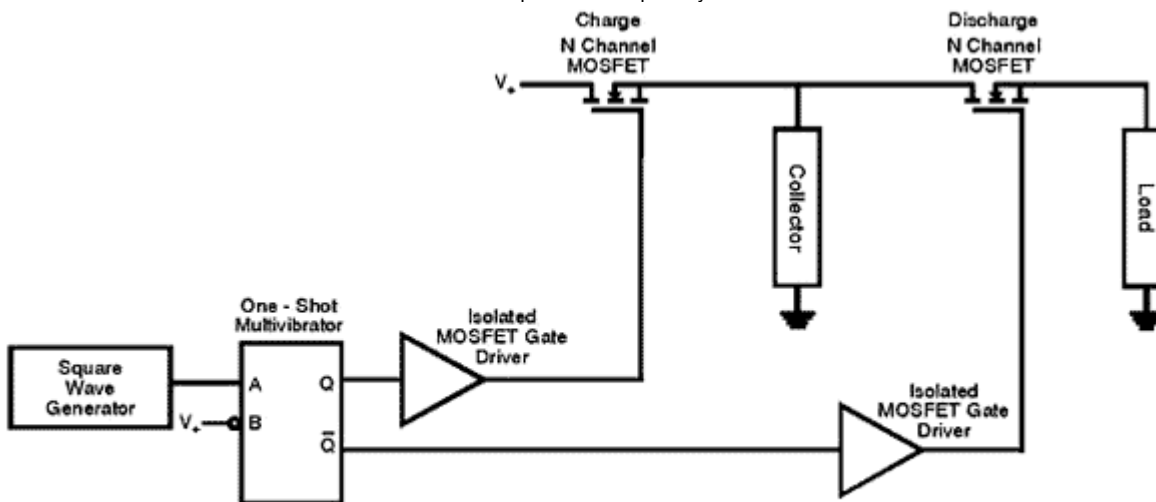


Figure 1B

Figure 1b. Type circuit for single pulse charging of a degenerative semiconductor collector without appreciable work, and separate discharge of the collected energy in the load without substantial depletion of the primary source.

Use of Step-Charged Capacitor as the Collector

Fulfilling our search for a special material with the extended electron gas relaxation time for the collector, a material alloy composed of 98% aluminum and 2% iron is tentatively suggested. However, production of this alloy is particularly difficult, so we are still researching for a solution that is more easily manufactured.

Meanwhile, the necessity for using a special material for the collector has been bypassed by another procedure we have utilized. Rigorously one can use a normal capacitor as the collector, if one step-charges it in several hundred small incremental rectangular voltage steps (stair-step-charging). The proof that this can freely charge a capacitor with energy, without having to do appreciable work, is already known in the literature. You can charge the capacitor without entropy and essentially without drawing electron mass current. [Ref 2,Ref 3,Ref 4,Ref 5]

Actually we consider the capacitor to be charged by massless displacement current flow, which for circuitry purposes we consider to be d/dt -- a flow of pure potential (trapped EM energy) along a conductor or through the

vacuum; i.e., under conditions where mass displacement current flow does not exist. [Ref 6, Ref 7]

Massless Displacement Current Is Freely Available From Any Source

The principle embodied in the invention is that one can extract all the free EM energy one wishes, from any electrical power source, as long as it is extracted via massless displacement current and not by electron mass flow current. [Ref 8] And one can freely collect this extracted energy from a source into an ordinary capacitor if one does it correctly, because one can charge the capacitor via massless displacement current without expending any appreciable work inside the source to dissipate its dipolar separation of charges.

Every Electrical Source of Potential Is Already a Free Energy Source

We thus advance a revolutionary concept: all present power systems already utilize free energy source-antennas. However, the standard two-wire closed circuitry diabolically utilizes one-half the total free energy extracted by the source-antenna from the vacuum, to perform work inside the source-antenna to dissipate its dipolarity and hence to dissipate the source-antenna (i.e. the receiver) itself.

The source already acts as a "dipolar antenna" to continually receive "scalar potential" current d/dt (massless displacement current) from the vacuum. [Ref 9] Previously scientists and engineers have simply ignored this special massless EM energy influx. For load-free (i.e., mass-current-free) conditions, (d/dt) is continually received from the vacuum by any dipole (i.e., by any dipolar source-as-an-antenna), and the flowing energy is continually exchanged back and forth between the vacuum and the dipole.

This free energy exchange with the vacuum is also true of any two points in our circuit that possess an open-circuit voltage or potential difference between them. Two such points act as a dipole. Free energy dipolar antenna sources are everywhere; we just have to learn how to break the symmetry in their energy flux exchange with the vacuum, collect some of the freely flowing influx, and distribute that collected excess energy to an isolated load to separately power it.

In other words, we simply have to implement circuitry that operates analogous to the standard heat pump cycle.

WHY PRESENT SYSTEMS HAVE COP < 1.0

Dissipative power inside source = $V I_T$ and $V I_T > F_L$

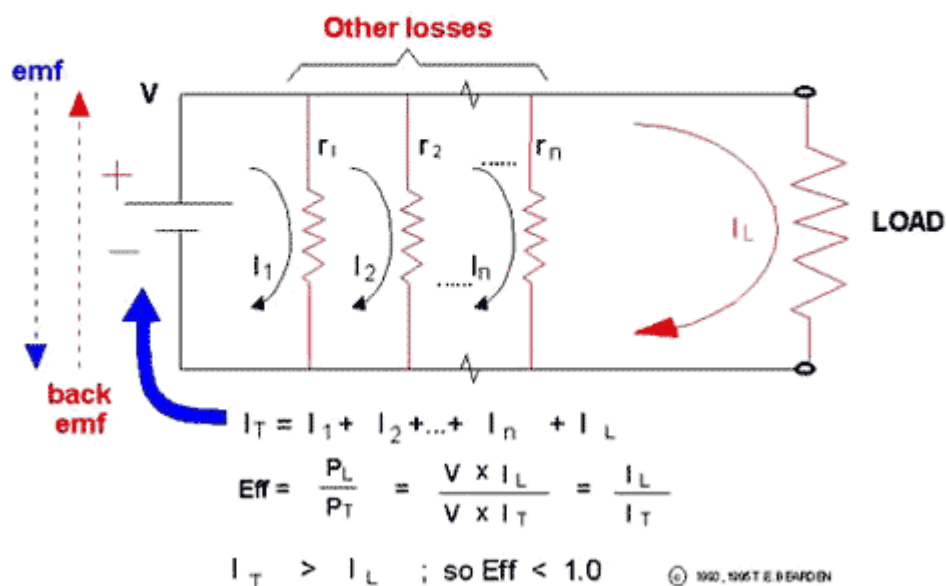


Figure 2. Why present electrical power systems have underunity operational efficiency.

Conventional 2-Wire Closed Circuit Operation

In the conventional 2-wire system a load is added to the source-antenna, allowing circulation of electron current

in a closed circuit through the load and then through the ground return line back to and through the dipolar source-antenna. The only useful reasons for this "closed circulation" of the electrons are:

- (1) it is simple, easy, habitual, and accepted
- (2) all our components, instruments, and methodologies are developed in accordance with this usage
- (3) one uses the electrons as a working material fluid to receive, transport, and discharge excess EM energy
- (4) forcing the electrons back through the back emf reloads the spent electrons again with excess EM energy in the form of little 's (excess trapped energy density) upon each recycled electron

Some of the excess collected upon the electrons is expended in the load as useful work, but one half of the total is expended in driving the spent (without excess Consequently all conventional 2-wire circuits, which return all external electron-flow current loops back through the source, are always underunity devices, as is shown in Figure 2.

Especially these conventional sources are already free energy devices, which are unwittingly attached to circuitry specifically designed to utilize part of their freely received energy to deplete or destroy themselves, i.e., they are already open systems receiving free energy from the vacuum, but they are hooked up and designed in a suicidal manner so as to use at least half of that freely extracted energy to re-close the system and shut off the influx of free energy. Since at least some of the remaining half of the energy is lost in inefficiencies, frictional losses, etc., less than half the total free energy goes to the load. So there is always less useful work being done in the load than the destructive work being done inside the free-energy source-antenna to destroy it.

Operational Efficiency

We define operational efficiency Alpha as the average power expended in the load to power it, divided by the average power expended inside the source to dissipate its dipolarity. If $\text{Alpha} < 1$, one has to externally furnish energy to do restorative work upon the source to replace or offset that amount of destruction being done inside the source, if one wishes the source to continue to operate as an energy-receiving antenna. If $\text{Alpha} > 1$, then if the additional losses are minimal, the device can conceivably run itself while furnishing some energy to a load to produce useful work.

We Must Excise the Suicidal Closed Circuit To Achieve Overunity

There is no mysticism in the overunity electrical device. The device is an open system that extracts excess energy from the vacuum, collects it, and transports it to the load to separately power the load. It is simply analogous to the standard heat pump cycle. It is also directly analogous to presently operating overunity systems such as windmills, waterwheels, solar cell arrays, and hydraulic turbines in a dam installation. All that we have done is to eliminate or dramatically reduce the standard cancerous mistake in conventional electrical power systems wherein much of the excess energy freely extracted from the vacuum by the already-overunity electrical source is then utilized to destroy the source's energy reception ability!

As we stated, in the conventional electrical device and circuitry, more destructive work is always done inside the source than is done usefully in the external load. Hence the conventional operational efficiency is always underunity.

Legitimate Overunity Systems Comply With Well-Known Requirements

There are many alternative and well-known permissible free energy systems that operate at overunity operational efficiency: solar cells, windmills, hydraulic turbines, heat pumps, and water wheels, to name a few. All of these are open systems, receiving an influx of free energy from a natural energy flow, and collecting and gating some of that energy to be dissipated in a load to do useful work.

All of them are permissible overunity devices, since

- (1) they are open systems
- (2) they constantly receive a free energy influx from an external source
- (3) they extract and collect some of this energy without dissipation
- (4) they dissipate this collected energy in a load
- (5) the discharge process is totally separated and isolated from the "collection-from-the-source" process

No Legitimate Overunity System Is Intentionally Made Self-Destructive

Not a single one of these open overunity systems foolishly uses part of its freely extracted and collected energy

to re-close the system and shut off its influx of free energy flow! What engineer would build a solar array such that, the moment the current started to flow, it powered a shutter arrangement to gradually close and shield off the solar array from the sun? Who would build a windmill so that, whenever the angled-blade assembly rotated in the wind to furnish power, a gearing feedback assembly also slowly caused the individual blades to rotate into a position parallel to the wind, thus stopping the windmill?

Yet this is precisely what the conventional electrical power system does with its external circuit. It deliberately utilizes half of the freely extracted energy to re-close the system and shut off the free energy flow between the vacuum and the source-antenna, by destroying the receiver-antenna!

However, this "suicide circuit" practice is guaranteed to keep the power meter on your home or business, and to keep the meter on the gas pump for fueling your automobile. Perhaps one may be forgiven for suspecting that, at the deepest levels of financial control, this may be the real purpose in seeing that the existing interpretation of classical EM stays "as is."

All Electrical Power Sources Are Already Free Energy Receiving Antennas

All conventional electrical power systems already contain fully functional free energy systems in their source component. Each conventionally designed system is, however, deliberately suicidal, since part of the system's own energy is utilized to work against itself and destroy itself. This is primarily due to the preoccupation of engineers with power and work. They do not consider the source as an energy source, but as a power source. Power being the time-rate of performing work, and work being the dissipation of energy, they are thus naturally conditioned to think of the "dissipation of the source" as its natural functioning.

In fact, hardly a single one of them is aware that EM energy itself is a free-flowing process. Only a finite collector possesses a finite collection of EM energy. In nature, the potential gradients of all dipoles are already rivers of free-flowing EM energy exchange with those dipoles, where the energy density is freely furnished and is essentially free for the taking. It is mind-boggling that we have all been conditioned to extract this free energy furnished by nature and the creator, but to always utilize half of the extracted energy to destroy the receiver-antenna and thus strangle the flow!

In our work, we simply have excised this "self-destructive" cancer and reworked the circuitry so that only a minimal amount of the freely extracted energy is utilized for internal destruction of the source-antenna.

Thermodynamics and Open Overunity Systems Not In Equilibrium

In our approach we have an open system during every collection cycle, with an external source of energy and a continual energy influx. We have deliberately broken the local symmetry of the system's energy exchange with the vacuum, by spatially and temporally separating the energy collection and energy discharge phases. Overunity operational efficiency is permissible for such a system without violation of any of the laws of nature. Some of the influx of excess energy from the vacuum into the dipolar source antenna is transported without loss to the collector and collected. The collected energy in the collector is then separately discharged through the load, without any of it being discharged back inside the source-antenna. Note that we have broken local energy flow equilibrium but not global energy flow equilibrium.

The second law of thermodynamics, e.g., does not even apply to such an open system not in equilibrium. Classical thermodynamics cannot even compute the entropy of an open system not in thermodynamic equilibrium, as is well-known to thermodynamicists. ^[Ref 10]

What classical thermodynamics does have to say, is that such an open system must contain excess energy when compared to the closed system in equilibrium, because the closed system in equilibrium is in the maximum entropy condition. ^[Ref 11] Global conservation of energy is not violated, just as it is not violated in a windmill or in a heat pump, which are similar open systems. Local conservation of energy (which applies only to a closed system or to a system in total equilibrium) does not apply because the system is open and not in equilibrium.

Permissible Electrical Overunity Is Not Perpetual Motion

An open system out of equilibrium need not conform to,

(1) the local (closed system, equilibrium conditions) conservation of energy nor to

(2) the second law of thermodynamics (which assumes equilibrium conditions).

It must and does conform to the global conservation of energy, just as does a waterwheel or windmill. We strongly stress that the overunity electrical device is not a "perpetuum mobile." ^[Ref 12] The electrical operations and systems we propose are perfectly permissible by the known laws of physics and do not violate any of them. We propose a permissible series of overunity electrical systems.

The Heat Pump Analogy

In one way of viewing it, all we have done is utilize the potential as a more modern type of quantum mechanical fluid having hidden bidirectional flowing EM energy. ^[Ref 13, Ref 14, Ref 15, Ref 16] QM already certifies that the potentials, not the force fields, are the primary causes of all EM phenomena. Contrary to classical EM theory, the force fields are effects in, on, and of the charged particles themselves. Consequently, if the potentials are the primary causes of all EM phenomena, then for free energy to perform work (free causes to collect and generate desired effects) we must turn to the potentials.

We have utilized a hookup and switching arrangement so that energy-free collection is totally separated from collected energy discharge in the load. In short, we have done what a normal heat pump does, when it uses the air with its thermal energy as a working energy-containing fluid. Consequently, overunity operational efficiency of analogous electrical devices is perfectly permissible, and not prohibited by the known laws of physics.

An Electrical Power Source Is a Dipolar Antenna For Free Reception of Energy

An electrical power source is in fact only a dipolar antenna for reception of potential (hidden bidirectional Whittaker/Ziolkowski waves). All the current you run back through the back emf of the source, to perform dissipative work inside it, is something you yourself are doing to the source. It is not a priori a characteristic of the source!

If no work is done inside the source's internal bipolar separation of charges (i.e., if no electron or ion current is forced back up from the ground return line against the source-antenna's potential and therefore against its back emf), then the dipolar source-antenna will last essentially forever, or until something corrodes or breaks mechanically.

The flow exchange of energy between the vacuum and the dipolar source-antenna is freely driven by all the charges of the universe, in accordance with Puthoff's cosmological feedback loop. ^[Ref 17]

Massless Displacement Current

Technically one is using massless displacement current to charge the capacitor, rather than electron mass flow current. It is real energy flow nonetheless; just in work-free, dissipation-free form. As is well-known, one plate of a capacitor already charges the other plate by just this very massless displacement current, transporting real EM energy across the gap between the plates in the process. The electrons themselves do not cross the gap.

Displacement current is already well-known to be "free" energy transport without any dissipation as power and work. By drawing massless displacement current only from the source-antenna instead of electron flow current, you can draw work-free, dissipation-free energy as long as you wish, as often as you wish, and as much as you wish, without ever dissipating the source-antenna. You just have to collect it onto some trapped electrons or other charges, such as in a capacitor's plates, then switch the collected energy (charged capacitor) separately across a load, in a separate discharge circuit, to discharge through the load as work.

The real trick is to prevent the electrons in the circuit from moving and providing mass "energy dissipation" current inside the source during the collection process. In the original paper, we explained that this could be done by using as a collector a degenerate semiconductor material, with extended electron gas relaxation time. In this paper we have explained how this can be done by step-charging an ordinary capacitor as a collector. We have also included specific references proving (both experimentally and theoretically) that this is correct. With the requirement for special materials removed, there is no reason that a competent researcher cannot develop a step-charged capacitor device to prove it experimentally for himself or herself.

Requirement: Proof of Principle and Independent Test and Certification

My associates and I are proceeding as rapidly as possible toward full-up "proof-of-principle" circuits for open

release and certification or falsification by the scientific community and engineers at large. Soon we also expect to release to other researchers information on the kinds of new electrical phenomenology one meets in true overunity electrical devices. These are not in the textbook, at least with respect to electrical power systems. We give some indication of these phenomena below:

New Circuit Phenomena Must Be Mastered

One meets unusual electrical phenomena in attempting to perform overunity electrical operations. For overunity, a priori one must "slip excess potential" through the circuit essentially without losses. That is, one must deliberately pass massless displacement currents through the circuit and at least through some of its components.

Solid-state switching components in particular exhibit unusual phenomena, to say the least, when excess potential is introduced into and through all their internal components inside modern semiconductors. An ordinary MOSFET, e.g., may have 25,000 separate internal components. It is as if someone crammed the entire electronic parts store inside it. Simple switches these semiconductors are not, when exposed to appreciable massless displacement current.

When one "slips in" some pure potential, by SWZ decomposition one has also slipped in some bidirectional EM pump waves. The nonlinear semiconductor materials will function as phase conjugate mirrors when suitably pumped, including at non-optical frequencies. Consequently pumped phase conjugate replicas, self-targeting, formation of quantum potentials, and modular variable effects sometimes begin to evidence. We will address and explain some of these effects in a future paper. For now, we simply state that they occur, and there is a host of extra phenomenology the experimenter may encounter.

However, an iron rule for the experimenter is that, for odd circuit behavior, first exhaust all "normal" causes before turning to the extraordinary causes. One will save oneself a great deal of grief by applying this Occam's razor.

Also in deliberately utilizing displacement current, one is actually employing an expanded, higher topology EM with additional degrees of freedom, similar to that pointed out by Barrett. ^[Ref 18] Consequently one encounters a host of additional higher topology EM phenomenology. In particular one encounters nonlinear optical (NLO) functioning of the semiconductors at any and all frequencies, not just in optical bands.

Overunity Electrical Devices Are Permissible By The Laws of Physics

The overunity electrical energy system is permissible by the laws of physics and is not in any manner perpetual motion. It simply extracts excess EM energy from an ubiquitous source, through a dipole as a receiver, and collects that excess energy, conducts it to the load, and separately dissipates it in the load to power the load, without using any of the collected energy to perform work inside the source to dissipate the source-antenna. It is directly analogous to a heat pump, which is well-known to perform at overunity operational efficiency under nominal conditions.

In Conclusion

Primarily my associates and I believe we have corrected an ubiquitous error made in present power systems that prevents these systems from realizing their already-inherent overunity operational efficiency. We also firmly believe that the permissible electrical overunity device is an idea whose time has finally come.

Notes and References

1. T. E. Bearden, "The Final Secret of Free Energy," distributed over the Internet, Feb. 9, 1993. The paper was also published in *Magnets*, 7(5), pp. 4-26 (1993); in *Explore!*, 4(3/4), pp. 112-126 (1993), and in several other media.
2. For proof that you can charge an ordinary capacitor almost without entropy, see I. Fundaun, C. Reese, and H. H. Soonpaa, "Charging a Capacitor," *American Journal of Physics*, 60(11), pp. 1047-1048 (1992). A capacitor can be step-charged in small steps to dramatically reduce the entropy required to charge it. In the limit, a theoretically perfect capacitor can be fully charged without any electrical current or work at all, i.e., you can simply transport the excess energy density (the potential gradient) of the

open circuit voltage of the source to the collector, and couple that to the electrons trapped in the capacitor plates, without electric current from or through the source.

3. M. G. Calkin and D. Kiang, "Entropy Change and Reversibility," American Journal of Physics, 51(1), pp. 78-79 (1983).
4. F. Heinrich, "Entropy Change When Charging a Capacitor: A Demonstration Experiment," American Journal of Physics, 54(8), pp. 742-744 (1986).
5. V. K. Gupta, Gauri Shanker, and N.K. Sharma, "Reversibility and Step Processes: An Experiment for the Undergraduate Laboratory," American Journal of Physics, 52(10), pp. 945-947 (1984).
6. In most texts the treatment of displacement current is far from adequate. A better treatment than most is given by John D. Krauss, Electromagnetics, Fourth Edition, McGraw-Hill, New York, pp. 437-439, 547-549 (1992). Additional useful insight can be gained from David J. Griffiths, Introduction To Electrodynamics, Second Edition, Prentice-Hall, Englewood Cliffs, New Jersey, pp. 304-308 (1989). Problem 7.51 on p. 335 is also of direct interest, as is particularly the comment by Griffiths below the problem. Additional insight can be gained from David Halliday and Robert Resnick, with assistance by John Merrill, Fundamentals of Physics, Extended Third Edition (1988), John Wiley & Sons, New York, vol. 2, Article 37-4: Displacement Current, pp. 836-837, 839-841. The standard notion is to:
 1. retain the continuity of current, thus modifying and salvaging Ampere's law,
 2. the displacement current is non-physical, i.e., it does not involve the transfer of charged mass,
 3. focus primarily upon magnetostatics as to the results achievable by the displacement current,
 4. retain the notion of as E, a force field, thereby focusing the notion of displacement current upon the change of the E field without the flow of charged mass, and
 5. retain the confusion between electrical charge and charged mass that is inherent in the terms "charge", "current", etc.
7. On p. 836 Halliday and Resnick point out that the displacement current is not derived per se, but is a "fit" based upon symmetry arguments, and it must stand or fall simply on whether or not its predictions agree with experiment. On the same page the displacement current is taken to be a linear function of d/dt . For flow along a circuit where there is no electron mass current, it seems appropriate to replace d/dt by d/dl . It is also strongly indicated that one should clearly distinguish between charged mass current flow and the flow of massless charge, which is the approach we have taken.

A final indication of the way conventional scientists tend to regard displacement current is given by Martin A. Plonus, Applied Electromagnetics, McGraw-Hill, New York, pp. 446-448 (1978). Here Plonus uses the prevailing notion of the E field being altered by the flow of massless displacement current. As can be seen, the displacement current is relegated almost to a curiosity of capacitors, and not really too essential except just to "balance the books" and retain Ampere's current continuity.

We now wish to point out something very subtle but very rigorous. CEM erroneously uses $E = -\nabla\phi$ to equate a mass-free potential gradient with a mass-containing force field. This "E-field" only exists at a point when there is a point-coulomb of electrical charged mass at the point. The real version of this equation should be $E = -[(\nabla\phi) \bullet q]/|q|$, where $\nabla\phi$ is the potential gradient coupled directly to the charged point-mass at the point, q is the number of coulombs of charged mass at the point, $q/|q|$ is one coulomb of charged mass, and E now is properly the force on and of each coulomb of the collected charged mass at the point.

Viewed in this manner, one can now see that the E field may be altered by flow of additional charged mass q , or by flow of massless additional $\nabla\phi$, or both. This is now in agreement with the manner in which it is approached in CEM, but more rigorous. Essentially it states we may increase the total "charge" (potential) at a point by either

1. moving in additional charged masses by use of a conventional current, or
2. moving in additional massless charge (potential) without any additional change in mass, or
3. a combination of the above.

However, let us apply this to a single charged particle or to a fixed number of them. No one seems to have noticed that the notion of altering the E-field of the collected point-charges at a point via method #2, i.e. by a flow of massless displacement current onto the fundamental charged particles themselves, a priori requires the electrical charge of each fundamental particle to change. Hence it falsifies the notion of quantization of charge.

Also, no one seems to have noticed the electric power implications: if it is known that one can charge a capacitor purely by displacement current, then one can charge up the capacitor with energy, without any dissipation of the source, because only charged mass current through the back emf of the source does that. So one can then disconnect the charged capacitor and separately connect it in a closed circuit with a load, to discharge through the load and furnish free work in the load (free in the sense that no dissipation of the primary source occurred in either the collection of the energy or in discharge of the collected energy through the load as useful work). Free energy, overunity electrical devices, etc. should then be readily apparent and permissible, from the known nature of displacement current and capacitors alone.

8. Maxwell assumed a material ether, which was assumed to be a thin material fluid filling all space. Hence force (which must have mass as a component due to its definition $F == d(mv)/dt$) could be modeled as existing in the Maxwellian ether, for there was already thin matter present everywhere. Hence in Maxwell's EM the incorrect notion resulted that force fields existed in the vacuum. Oliver Heaviside continued this erroneous assumption, since in fact he hated the potentials, regarded them as mystical, and stated that they should be "...murdered from the theory." Also, electricity was thought to be a similar thin material fluid. So the material electric fluid could and did flow through the fluid vacuum also, giving the notion of the material electric flux density for D. Consequently, the units of D are coulombs (charged mass rate of flow) per square meter.

Rigorously, that material D flux exists only on and of charged mass that moves; it cannot and does not exist in vacuum. Only potentials and potential gradients exist in vacuum. However, after Maxwell's formation of his theory, the Michelson-Morley experiment destroyed the material ether (not the ether per se, but its material nature). So electricians then simply proclaimed that they were no longer using the material ether, and that such did not exist! Not a single Maxwell/Heaviside equation was changed. The material ether is still very much assumed in classical EM (CEM) theory, and so the theory is accordingly very seriously flawed. Since CEM also has no adequate definition for either electric charge or the scalar potential, the problem is confounded.

To clarify this problem, one must separate the notion of electric charge from the notion of mass. The electrical charge of a charged mass is the virtual photon flux exchange between the surrounding vacuum and that mass. Since a virtual photon flux is just a scalar potential, the electron's massless electrical charge is simply its scalar potential. It can now be seen that, if we forcibly remove the notion of "mass" from D in the vacuum, or in a charged material medium where the charged masses cannot move, then the "material electric flux concept" portion of D turns into $d\phi/dt$, a change in the nonmaterial electric flux. However, D is a vector and hence has a "net flux" spatial directional aspect which d/dt alone does not possess. It follows that the value of $d\phi/dt$ at a spatial point actually represents the result of change of the value of ϕ at that point, as a function of time.

Thus a directional operator must first be invoked upon ϕ at the point, to provide a direction for the spatial ϕ -current after the $d\phi/dt$ operator is invoked. The appropriate operator to give directionality to ϕ is ∇ , so that D in vacuum or in an electron-current-free charged medium becomes a function of $d/dt(-\nabla\phi)$. Conventionally, the use in the literature of $E = -\nabla\phi$ immediately provides that $d\phi/dt(-\nabla\phi)$ at a point results in dE/dt , or the time rate of change of the E-field at that point. If no distinction is made between charged mass current flow and massless charge current flow, this would be true in either vacuum or material media. However, we wish to specifically distinguish between massive displacement current and massless displacement current. So we point out that the increase dE/dt in the magnitude of the E-field at, on, and of a charged particle at a point, can be due to either

1. the flow of mass current to build up the number of point coulombs at that given point, where each coulomb has a fixed massless charge (potential), or
2. the flow of massless current $d/dt(-\nabla\phi)$ so as to alter the value of ϕ at that point, evidenced by a fixed number of coulombs of charged particles, each of which has altered its individual potential and therefore its individual massless electrical charge.

So what "flows" when the charged masses are frozen or absent is simply a current of scalar potential, resulting in a change of the potential upon fixed point charges of $d\phi/dt$. This is what crosses between the plates of a capacitor, e.g., which is where the notion of "displacement current" originated in the first place. (See, e.g., Halliday and Resnick, 1988, *ibid.*, p. 836, Sample Problem 1, for expression of the displacement current as $d\phi/dt$, neglecting constants of proportionality). This is also what flows when one connects multiple open circuit pairs of conductors to a source.

It remains to examine Maxwell's equation $\nabla \cdot D = \rho_v$. If mass displacement current cannot flow, then there exists no divergence of the mass current portion of D . However, massless displacement current can still flow, and there can exist divergence of that component. There are now three aspects to that equation:

3. the case in the vacuum, where there exists no physical ρ and hence no ρ_v as such because of the absence of mass,
4. the case in a material medium, which is the normal case already treated in the standard equation and need not be further addressed, and
5. the case in a material medium where, nonetheless, physical charged masses such as electrons cannot move, but massless charge currents may still move.

Only cases 1 and 3 need to be addressed, and they have the same treatment.

We address the one dimensional case, which is sufficient for circuit current flow considerations. First we replace D with $(D_\emptyset + D_\rho)$, where the first term is the massless displacement current and the second term is the massive displacement current. In other words, we account separately for charged mass flow and for massless charge flow. Similarly, we express ρ_v as two components, one massive and one massless, so that $\rho_v = d/dl(\phi + m_v)$. For case 1 and case 3 we make $m_v = 0$ and $D_\rho = 0$. For those cases, we have $\nabla \cdot D = \nabla \cdot D_\emptyset = d\phi/dl$ (since current along a wire is a one-dimensional flow). We specifically note that ϕ , D_\emptyset , $\nabla \cdot D$, and $d\phi/dl$ are not necessarily conserved quantities, since is mathematically decomposed into bidirectional EM waves, and is hence a freely flowing process. When symmetry is broken so that equilibrium conditions no longer exist, one or more of these quantities will not be locally conserved.

What has actually been done here is to open the classical EM model to the free exchange of massless EM energy that is always ongoing between any charged particle's mass and the vacuum. We then account separately for the flow of the energy exchange (of the massless charge flow) and the flow of the physical receiver/transmitters (i.e., for charged mass flow). Our switching arrangement to separate the collection and discharge cycles constitutes a permissible "Maxwell's Demon" which breaks symmetry, hence breaks equilibrium and opens the system as required. Since such a system can continually receive a free influx of energy from its external source, such a system can permissibly exhibit overunity operational efficiency without violating the laws of physics.

9. Displacement current is already known to be lossless transport of energy without entropy, i.e., without work. For a typical confirmation see Jed Z. Buchwald, *From Maxwell to Microphysics*, University of Chicago Press, Chicago and London, p. 44 (1985). Quoting:
 1. "...no energy transformation into heat occurs for displacement currents."
10. We strongly stress again that the scalar potential may be mathematically decomposed into a harmonic series of hidden bidirectional EM wave pairs. Each wave pair consists of an ordinary EM wave together with its superposed phase conjugate replica wave. Thus internally the scalar potential gradient across a source represents a bidirectional exchange of EM wave energy with the surrounding vacuum. See notes 13, 14, 15, and 16 below for references confirming the decomposition of the "fixed" potential into a dynamic flow process and energy exchange process.
11. For confirmation see Robert Bruce Lindsay and Henry Margenau, *Foundations of Physics*, Dover Publications, New York, pp. 283-287 (1963). See particularly p. 283, which emphasizes that a "field of force" at any point is actually defined only for the case when a unit mass is present at that point. See p. 17 on the limitations of a "natural law"; p. 213 and 215 for limitation of thermodynamic analysis to equilibrium states; and see p. 216 for definition of entropy. See p. 217 for the fact that the entropy for non-equilibrium conditions cannot be computed, and the entropy of a system not in equilibrium must be less than the entropy of the system in equilibrium, i.e., for a system to depart from equilibrium conditions, its entropy must decrease. Therefore its energy must increase. Thus the energy of an open system not in equilibrium must always be greater than the energy of the same system when it is closed and in equilibrium, since the equilibrium state is the state of maximum entropy.
12. Lindsay and Margenau, *ibid.*, p. 217.
13. The basic notion in the perpetual motion conundrum is that somehow a closed system in thermodynamic equilibrium could perpetually provide external energy to a load outside the system. Such a notion is an oxymoron; if the system is closed, no energy can escape or enter, hence the

system could not furnish energy externally to power a load or even just to radiate away. My associates and I have not in any manner proposed such a system or entertained the notion that such might exist. But it is well-known that open systems not in thermodynamic equilibrium can freely extract energy from their environment and furnish energy to power a load, and that is precisely what we have proposed.

14. G. J. Stoney, "XLVIII. On a Supposed Proof of a Theorem in Wave-motion, To the Editors of the Philosophical Magazine," *Philosophical Magazine*, 5(43), pp. 368-373 (1897).
15. E. T. Whittaker, "On the Partial Differential Equations of Mathematical Physics," *Mathematische Annalen*, vol. 57, pp. 333-355 (1903). Whittaker mathematically decomposes the scalar potential into a bidirectional series of EM wave pairs in a harmonic sequence. Each wave pair consists of the wave and its phase conjugate. (We have pointed out elsewhere that such a wave pair is a standing electrogravitational wave and a standing wave in the curvature of local space-time). To see that all classical EM can be replaced by interference of two such scalar potentials (i.e., by the interference of their hidden multi-wave sets), see E. T. Whittaker, "On an Expression of the Electromagnetic Field Due to Electrons by Means of Two Scalar Potential Functions," *Proceedings of the London Mathematical Society*, Series 2, vol. 1, pp. 367-372 (1904).
16. Richard W. Ziolkowski, "Localized Transmission of Electromagnetic Energy," *Physical Review A*, 39, p. 2005 (1989). For related material, see Richard W. Ziolkowski, "Exact Solutions of the Wave Equation With Complex Source Locations," *Journal of Mathematical Physics*, 26, pp. 861-863 (1985). See also Michael K. Tippett and Richard Ziolkowski, "A Bidirectional Wave Transformation of the Cold Plasma Equations," *Journal of Mathematical Physics*, 32(2), pp. 488-492 (1991).
17. C. W. Hsue, "A DC Voltage is Equivalent to Two Traveling Waves on a Lossless, Nonuniform Transmission Line," *IEEE Microwave and Guided Wave Letters*, 3, pp. 82-84 (1993).
18. H. E. Puthoff, "Source of Vacuum Electromagnetic Zero-point Energy," *Physical Review A*, 40(9), pp. 4857-4862 (1989). Presents Puthoff's self-regenerating cosmological feedback cycle for the source of the vacuum EM zero-point energy.

Our comment: Over any macroscopic range, the vacuum fluctuations ('s) of the ZPE sum to a vector zero translational resultant. The individual ZPE components ('s), however, are still present and active, and their energies are present as well. That vector zero can thus be considered to be a gradient-free potential, or the vacuum potential, since it contains enormously dense, trapped EM energy. So the vacuum potential -- pure space-time (ST) itself -- contains enormously dense EM energy.

One can then apply the Stoney/Whittaker/Ziolkowski (SWZ) methodology to decompose this powerful vacuum potential, i.e., the vacuum, and in fact space-time (ST) itself, into an incredibly dense flux of EM energy. Space-time is revealed to be an incredibly powerful electrostatic scalar potential. The electrical charge (potential) of a charged particle is a small potential gradient in the ST potential, i.e., it is a slight alteration of the local ST potential. Via Puthoff's self-regenerative feedback cycle, the energy flowing in this potential is being exchanged between the local source and all the charges everywhere in the universe. This "potential gradient" or electrical charge itself can be decomposed via the SWZ approach, and becomes a bidirectional EM wave pair exchange of excess EM energy between the vacuum/ST and the charged particle's mass. The potential gradient between the ends of a dipole have similar decompositions, with the additional characteristic that the negatively charged end of the dipole receives the forward-time waves from the SWZ wave pairs, and the positively charged end receives the time-reversed waves.

Our final comment is that Cole and Puthoff have rigorously shown that, in theory, the vacuum EM energy can indeed be extracted. See Daniel C. Cole, and Harold E. Puthoff, "Extracting Energy and Heat from the Vacuum," *Physical Review E*, 48(2), pp. 1562-1565 (1993).

19. T. W. Barrett, "Tesla's Nonlinear Oscillator-Shuttle-Circuit (OSC) Theory," *Annales de la Fondation Louis de Broglie*, 16(1), pp. 23-41 (1991). Barrett shows that a higher topology EM model (e.g., EM expressed in quaternions) allows shuttling and storage of potentials in circuits, and also allows additional EM functioning of a circuit that a conventional EM analysis cannot reveal. As an example, one may meet optical functioning without the presence of optical materials.

Precursor Engineering Directly Altering Physical Reality

Abstract and Summary

We discuss the abbreviated background of Maxwellian electrodynamics, including how the model's erroneous "force field in massfree space" construct came to be. The field in space is not a force field, as is well known, but is merely spatiotemporal energy structuring and patterning. It can be considered as a curvature of spacetime (general relativity view) or as a change in the virtual particle flux of the vacuum (particle physics view). It is a pure energy field. Spacetime is identically energy; virtual particle flux of vacuum is identically energy. A region of change is an energy field.

The energy field in space is only a precursor of the force field in matter; no force is present or involved until the precursor field interacts with charge and mass to produce a force field with mass as a component.

Technically, the change and structuring of massless spacetime/vacuum to produce a net precursor field is asymmetric regauging, and it requires no work because of the well known gauge freedom axiom. The form of the energy is not changed, and work is the change of form of energy. One is permitted to freely change the potential—and the potential energy—of the Maxwell-Heaviside equations (and thus of any physical Maxwell-Heaviside system) at will; e.g., as shown by Jackson ^[1] and many others.

Thus, changing the force-free "EM field"—as it exists in space in its precursor form (energy field form) prior to its interaction with charge and matter—is work-free.

Very large changes in the precursor field state of a Maxwell system can be done by paying only a bit of work for timing and switching the technological systems performing the regauging. Once formed "nearly for free", the large precursors can then be interacted with charged mass to freely form very large force fields and their dynamics (i.e., precise sets of very large forces, including dynamics, in the interacting material system or medium as desired). We call such assemblies engines.

Spacetime is identically energy, and a curvature of spacetime is identically an energy field available to interact with mass to form force.

Vacuum is identically energy, and a change in the virtual particle flux density of vacuum is identically an energy field available to interact with mass to form force.

Let the term engine refer to either a set of forces or a set of precursors, with the dynamics of the set included. One can almost freely produce strong precursor "engines" and dynamics, and then interact these precursor engines with charged mass (the system medium) to produce very powerful force engines and dynamics in the material system. In this way, one can very powerfully (and almost freely) produce and engineer all fundamental forces of nature, by first engineering the precursors and their dynamics, then allowing free precursor interaction with charged matter so that the "primary forces" are produced as desired.

In this way, physical reality itself—on any and all levels—can be very powerfully engineered at will, without large exertion of operator-furnished power, once precursor engineering technology is developed. This is a negative entropy operation violating the present second law of thermodynamics (which artificially excludes such negative entropy processes). The second law is already totally refuted by gauge freedom itself, as well as by every charge, EM field, and EM potential in the universe.

The first law of thermodynamics also contains an error in its present form, when it assumes that a change of energy magnitude (as in the change of a system parameter such as the potential) is work a priori. To the contrary, work is performed only if the form of the excess input (regauging) energy is changed. Mere transfer of additional energy in the same form is not work. The present first law must be slightly corrected, since as written it prohibits gauge freedom and thus prevents precursor energy field engineering.

We briefly discuss some relevant historical background and several small examples that demonstrate the

overwhelming importance of this work and its future dramatic extensions of science and technology, hopefully for the great benefit of all humanity.

Development of Maxwell-Heaviside EM Theory

The Maxwell-Heaviside theory of electrodynamics is now well over a century old. It may be taken as dating from Maxwell's 1865 theory^[2] of 20 quaternion and quaternion-like equations in 20 unknowns—although Maxwell had written earlier papers on Faraday's lines of force and on the characteristics of the medium. More than a decade earlier, quaternions had been founded by Hamilton^[3], but there were exceedingly few scientists who understood them or even liked them. Most could hardly tolerate Hamilton's quaternions!

Maxwell published his famous Treatise in 1873^[4]. Because it was "tainted" with a higher group symmetry algebra (quaternions), even Maxwell himself came under intense pressure from his publisher to simplify the material in his Treatise. Consequently, Maxwell began rewriting and greatly "watering down" his own theory, having finished rewriting and greatly reducing some 80% of it at the time of his death in 1879. The posthumous later editions published in 1881 and 1891 represent a very serious truncation of the original Maxwellian theory.

In the 1880s, a further great "simplification" was generated by several scientists after Maxwell's death—and notably by Heaviside, Hertz, and Gibbs, with regauging by Lorentz. Vector algebra—whose group symmetry is much lower than that of quaternion algebra—was formed^[5] and became the accepted algebra in which the reduced equations were recast. The lowered group symmetry of vector algebra further reduced the operationalism described by the theory in its quaternion-like form. Even the tensor algebra of today is still of lower group symmetry than quaternions.

The equations taught today at university as "Maxwell's theory" are thus pale shadows, and those equations themselves are actually the equations and notations of Heaviside, having been further "symmetrically regauged" by Lorentz^[1, 6]. The symmetrical regauging imposed by Lorentz very neatly threw out all COP>1.0 Maxwellian systems taking their excess energy from the active vacuum in the form of free asymmetrical regauging^[7]. It also discarded precursor engineering.

At the time these truncated (mutilated may be a better word!) Maxwell equations were adopted in general, it occurred in a short "debate" (mostly in the journal *Nature*) where the vectorists simply discarded the quaternionists' work, etc.^[5] It was not done by "sweet science", but by dogma and individual preference for "greater simplicity". Its driving force was the near-universal dislike of quaternions and a strong drive to simplify things as much as possible.

Material Ether and "Force Fields in Space"

The "Maxwellians" as they are often referred to, all originally assumed the material ether filling all space (and so do electrical engineers today, unwittingly!). Thus they assumed there was not a single point in the entire universe that was devoid of mass. Consequently, the EM fields were—to them—obviously very material fields indeed; i.e., to the Maxwellians they always occurred in mass (e.g., in the material ether or in common matter). They were therefore erroneously assumed to be force fields, and in the view of the Maxwellians a "force-free field" was not possible.

By $F = \partial p / \partial t = \partial / \partial t (mv)$, we know that mass is actually a component of force (though inexplicably that is still erroneously ignored in both classical mechanics and electrical engineering). There is no separate mass-free force acting upon a separate mass, because the phrase "mass-free force" itself is an oxymoron. Many foundations physicists such as Wheeler, Nobelist Feynman, etc. have thoroughly discussed this "material origin of force", so it is well known by leading scientists (though seldom known to electrical engineers whose flawed model still blithely assumes EM force fields in mass-free space).

Today, our Maxwell-Heaviside classical EM theory still implicitly retains the old material ether more than 100 years after that type of ether was specifically falsified by the Michelson-Morley experiments^[8]. Not a single material-ether-assuming EM force field equation was changed after those experiments! By retaining the material ether, the theory has actually concealed the precursor mass-free fields and the astounding ramifications of developing precursor engineering technology^[9].

Oddly, we therefore we have a peculiar scientific situation and one of the great stalemates in human scientific

history: The most primary kind of physics has been largely ignored in the West. It has not been ignored in some other places, but unfortunately there it has only been used for development of weapons in secret. We do not discuss the weaponry in this paper.

Nobelist Feynman certainly understood there were no force fields in space. He made the following observation [10]:

"...the existence of the positive charge, in some sense, distorts, or creates a "condition" in space, so that when we put the negative charge in, it feels a force. This potentiality for producing a force [i.e., this distortion of spacetime] is called an electric field."

Yet Feynman himself did not adequately define force, and in fact despaired of finding such a definition—apparently because he did not connect the change produced by observation. He stated [11]:

"One of the most important characteristics of force is that it has a material origin, and this is not just a definition. ... If you insist upon a precise definition of force, you will never get it!"

In modern physics terms, a "force" is generated in, on, and of a mass (e.g., a charged mass). It is generated when the volumetric mass-free fields (as curvatures of spacetime relativistically, or as altered virtual particle flux of the vacuum region in particle physics) in mass-free space interact with and on a charged mass. That ongoing interaction of a 4-space massless entity (the precursor) with a previously observed 3-space mass is what a "force" identically is, prior to its observation by invoking a $\partial/\partial t$ operator. Observation results in a frozen 3-space snapshot at that instant—as is well known, time is not an observable, even in principle.

Precursor Engines and a Physical Mechanism of Regauging

We now have added a physical mechanism to the abstract notion of "asymmetrical regauging", where a potential (and the potential energy) of the system (i.e., the magnitude of the spacetime curvature/altered vacuum virtual particle flux interacting with the charged mass) is freely changed. Further, this physical mechanism can be engineered rather directly. Suddenly we are not trapped in "force field engineering" as the primary causative action, but in "spacetime/vacuum energy" engineering as the primary causative interaction.

In short, now we have moved from the hoary old entropic force field engineering to negentropic precursor engineering as our primary interest.

Let STC be "spacetime curvature(s)". Let VPF be "virtual particle flux" of the vacuum.

Consider any physical system and its dynamics. There is a specific set of forces and their dynamics, involved in that system functioning. Call this set of forces and their dynamics a force engine. But we know that, for any force, there is a precise massless 4-spatial precursor interacting with the mass component of the force.

Prior to observing the system, consider the 4-spatial characteristics. At any instant, there is a set of mass-free 4-spatial STC/VPF dynamics interacting with the previously observed system masses at all levels, changing the observable system masses and their dynamics as time passes.

Now separate the masses from the STC/VPF dynamics—which separates force into its components of mass and precursor energy field. Call this set of STC/VPF dynamics a precursor engine. Rigorously this precursor engine and each part of its structure is what we refer to as energy. The precursor engine has the capacity (potential) to cause work, since it has the capacity to make a force engine by its interaction with mass, and $W = \int \mathbf{F} \bullet d\mathbf{s}$ for any force \mathbf{F} in the force engine.

We have now solved one of the additional problems which gave despair to Feynman: the definition of energy. Feynman also said [12]:

"It is important to realize that in physics today, we have no knowledge of what energy is."

Yet to change the precursor engine itself requires no work, since there is no mass and hence no \mathbf{F} , and thus $\int \mathbf{F} \bullet d\mathbf{s} = 0$ because $\mathbf{F} = 0$. Prior to its interaction with mass to form a force engine and generate work, the precursor engine is merely structured potential energy with dynamics.

Here is the great shocker: Merely changing the structured potential energy—i.e., changing the precursor engine, in magnitude or function or whatever—is work-free a priori because of the total absence of force. Changing the precursor engine is changing some potential energy (magnitude, direction of flow, dynamics, etc.) and that is mere regauging. It is work-free by the well known gauge freedom axiom, widely used and accepted in physics.

By engineering the precursor engine itself, and then applying the altered precursor engine to an appropriate mass system, real work can freely be produced in the physical system. In the real world, the scientist may have to pay a little to do the switching and timing, but he need not pay to furnish the regauging potential energy required to change the precursor system and thereafter produce the force engine.

Thermodynamics and Entropy

We have all been taught that a dynamic system is like a leaky diode. I.e., one pays to input some energy to the system, it spills some of it in its internal operations, and one gets out (as energy or useful work) less than one put in. In short, we have erroneously been taught that all engineering is entropic. The second law of thermodynamics has stated that, in progressive operations, the system can either at best keep the entropy (energy of which control and use is lost) the same, or have the entropy increase with time. It is known, of course, that second law violation does occur for small systems and relatively small times, due simply to fluctuation of the statistics on which it is based.

With precursor engineering, however, we have totally violated the second law of thermodynamics, since we ourselves need input only a tiny bit of control and switching energy, to control and use a much larger amount of working energy. The environment freely inputs a great deal more regauging energy for usage, and we need only control it. In short, we have moved from the “leaky diode” type engineering to the “triode” type engineering. Now we have to pay a little for the “control” grid signal, but the cathode energy flow that is controlled, gated, and shaped to provide the plate energy (plate force engine) is freely input by the environment (by regauging).

We have moved from “entropic engineering” to “negentropic engineering” because triode engineering is also a process for re-ordering disordered energy. It is a process for consuming entropy and producing negative entropy.

Precursor engineering focuses attention on a much more primary cause of forcible actions than the presently considered “fundamental forces of nature” approach. Instead, it focuses upon the fundamental precursor engines that, once formed by free regauging, then freely produce forces that perform work upon systems to alter them, do useful work, etc. That is a purely negative entropy function, totally engineerable. It alters and completes the presently crippled Second Law of thermodynamics (which presently only allows entropic processes, although inherently assuming that its own contradiction has first occurred). Specifically, it changes the Second Law to permit negative entropy processes and functions in addition to positive entropy processes and functions.

In the not too distant future, hopefully precursor engineering will completely revolutionize science and engineering in a myriad of areas, from physics to medicine. In theory, any operational functioning in material physical systems can be directly engineered by pure regauging, simply by freely changing the precursor engine involved in that system in a fashion that interacts to create the necessary force engine and dynamics.

This new and revolutionary negative entropy engineering, will eventually be developed to replace the present hoary old entropic engineering. It now lends real substance to the theoretical proof by D. Evans and Rondoni^[13] that nonequilibrium steady state (NESS) systems can indeed—at least in theory—produce continuous negative entropy. Evans and Rondoni were so startled at their theoretical results that they felt no real physical system could exhibit such a Gibbs entropy—i.e., starting negatively at the onset and thereafter continuously decreasing toward negative infinity as time passes. To the contrary, every source charge and dipole in the universe exhibits precisely that action^{[14], [15], [16]}.

Unknown to Evans and Rondoni, Leyton^[17] has also originated and published the higher group symmetry geometry necessary to replace the more limited old Klein geometry^[18] of 1872. Now a hierarchy of symmetries results in Leyton object-oriented geometry. A broken symmetry at one level does not lose information at that level a la Klein. Instead, it retains the information and also automatically generates a new symmetry at the next higher level—a purely negative entropy operation from first principles! So the proper geometry necessary to allow revision of the old Second Law has been advanced by Leyton.

The dramatic extension of the Second Law of thermodynamics to add negentropic processes due to precursor gauge freedom also resolves the very vexing present major time asymmetry problem of thermodynamics itself: If in a given set of processes the entropy either remains the same or increases, then how was the entropy of the universe ever so low in the first place, and how is it so low now? This “greatest thermodynamics problem”^[19] cannot be solved in Klein geometry, but it is solved when Leyton geometry and a unified field theory separating

force field and precursor field are utilized.

What Gauge Freedom Has Been Trying to Tell Us

In short, the universality of gauge freedom has more to it than simply changing some equations so they are easier to solve, as Lorentz did to the Maxwell-Heaviside equations by symmetrically regauging them. In symmetrically regauging the equations, unwittingly Lorentz first evoked precursor engineering, but then locked up the extra free energy by allowing it to produce only equal and opposite forces and stress in the system, never useful work. He did this by eliminating all asymmetrical regauging which would produce a net force field. In that astounding and crippling limitation, Lorentz chose only that subset of Maxwellian systems and precursor engineering that cannot and does not produce energy available to do useful work in the load. Instead, it bottles up all the energy freely received by regauging, as additional stress in the system. To say that this is short-sighted is the understatement of the century! It was done merely to make the equations "more tractable" and amenable to closed solution methods.

Asymmetrical regauging is the wave of the future, for it also is identically work-free precursor engine engineering. It does freely produce a net precursor field and a net force field, thus allowing useful work to be done "for free" or "nearly for free".

Gauge freedom directly assures us that the potential energy of any EM system can be freely changed at will. If we put our minds to it, we can take in all the EM energy we wish, directly from the local vacuum VPF and curvature of local spacetime, anywhere in the universe by developing and utilizing asymmetrical regauging.

As a trivial example, merely changing the voltage of a system—while freezing the electrons so no current flows—changes the collected energy in the entire circuit; because it changes the potential intensity in which each Drude electron is embedded and with which it is interacting. The solution to the entire energy crisis, for all time, simply waits for scientists to discard symmetrical regauging (no net force fields produced, even though two new free force fields are produced but in equal and opposite fashion). In symmetrical regauging, all the excess free energy in the two new fields freely produced is locked up as stress energy, causing additional stress in the system. However, none of the excess free energy can be used to translate electrons as current, so the energy so freely received cannot perform useful external work in the load, by deliberate design!

To borrow a phrase from Nikola Tesla, this will one day be recognized as "one of the most inexplicable aberrations of the scientific mind" in recorded history!

By going directly to asymmetrical regauging, which also is precursor engine engineering, one produces both excess free EM energy and a free net force field that can be then freely dissipated to perform free work in a load, paying only for switching and timing costs, etc. Of course one has to employ circuitry other than the closed current loop, common ground circuit! That circuit automatically self-enforces symmetrical regauging (and deliberate crippling of precursor engineering) regardless of how much extra free regauging field energy is added to the system.

The Precursor Is Nonobservable

As pointed out, the problem of the "force field" not existing as such in space is further complicated by the nature of observation itself. Observation is a $\partial/\partial t$ operator imposed upon that ongoing interaction of the precursor and the charged mass in 4-space. The result is the stripping away of the time dimension momentarily, producing a frozen 3-spatial snapshot. A rapid series of such continual 3-snapshots, and their recall from memory and comparison, gives us the sensation and experience of "change" and "persistence in time" or "change in time".

We never observe the precursor causes, but only the effects of those precursor causes in mass. From observing the effects, we always have to extrapolate the unobservable precursors that are the unobserved causes. One cannot "see" the accelerated frame one may be in, but one can measure the effects of that non-observable frame on one's physical system and surroundings.

Additional Shortcomings of Classical Maxwell-Heaviside Theory

The present Maxwell-Heaviside theory is completely unable to deal with the massless interactions and the force-free entities that interact with mass to produce force. The present EM does not even calculate "the" spatial

fields or potentials themselves, but only their "point intensities" when interacting with static matter, as defined by the assumed interaction of the actual geometrical fields with a unit point static charge at every point. To see how this remains confused, we quote Jackson ^[20]:

"Most classical electrodynamicists continue to adhere to the notion that the EM force field exists as such in the vacuum, but do admit that physically measurable quantities such as force somehow involve the product of charge and field."

So the precursor spatial "field" is actually not defined in classical EM, but only its intensity as indicated by a unit point static charge's scattering of energy from the Whittaker flows comprising the spatial field itself. What is scattered from a river's flow by a fixed static rock is not the river! And what is scattered varies as the condition of the rock. The same rock, placed in violent churning motion to and fro, will scatter much more energy from the same river's flow.

As an example of violating that static indication of "field intensity", if the interacting charges of an absorbing medium are in particle resonance at the frequency of the input field energy bathing them, the very "definition" of the classical field intensity is thereby altered. Then one can extract more energy from the intensity than is theoretically predicted by the Poynting theory—i.e., by standard "static charge" definitions of field and potential intensities. It has been in the physics literature for some decades, without scientists realizing the true implications.

The same charge in particle resonance at UV or IR will absorb and re-radiate some 18 times as much energy as we input to it (by standard calculations), from the same classical field, as it does when totally static and not in particle resonance ^[21]. That area of physics is of course well known as negative resonance absorption of the field. It is a noted example of the direct extraction of excess EM energy from the "vacuum" or from curved spacetime, long proven on the bench. Physicists in that field, however, carefully refrain from using the term "excess emission of energy from the resonant medium", or the thermodynamics term of coefficient of performance (COP). The COP = 18, of that EM system, but the scientists only carefully write and speak of the change in the reaction cross section of the resonant particle versus that of the static particle.

Importance of the Supersystem

In modern physics, we might add the term supersystem ^[22]. The supersystem consists of three components, which are

- (1) the physical system and its observed dynamics
- (2) the unobserved but active local vacuum and its dynamics
- (3) the local curved spacetime and its dynamics

All three elements of the supersystem constantly interact with each other, in modern physics.

In the present classical Maxwell theory, both of the two unobserved supersystem components (the actual force-free precursors that act on the system to generate all its forces and dynamics) are arbitrarily assumed away. The crippled Maxwell theory assumes an inert vacuum (falsified since the 1930s) and a flat spacetime (falsified since 1916). By using force fields and potentials only defined in terms of intensity of the interactions in static charged matter, it only considers effects of the precursors after their interaction with static mass. These effects then further generate other forces in collisions and interactions.

The fact that force fields are still erroneously assumed in space, by standard classical EM and electrical engineering, retains the material ether in the model. Thus the standard model has already discarded (erroneously) the precursor engines and precursor engineering (deliberate use of asymmetric regauging as a simple and universal means of taking and using enormous EM energy from the active vacuum/curved local spacetime).

Because of this continued assumption of the material ether by ordinary EM models, we have missed the ability to directly (and work-free) engineer the massfree precursor to force. We have therefore been unable to rigorously define force (as pointed out strongly by Nobelist Feynman ^[11], by Wheeler, and many others) or energy ^[12]. Force is the interaction of precursor field with mass, and energy identically is the precursor field.

Classical electrodynamicists just continue to dispose of the "no force-in-space" problem, with a remark similar to that of Jackson previously quoted ^[20].

Higher group symmetry EM theory, however, can get directly at all those long-ignored electrodynamic entities and mechanisms, including the precursors, precursor engines, and their free (regauging) generation of forces

and force engines in matter As an example, the Evans model ^[23] is a unified field theory, and quite capable of modeling the interactions between the three components of the supersystem. The present classical electrodynamics cannot and does not do that.

In short, precursor engineering can be developed whenever the scientific community will move off dead center, fund the sharp young graduate students and post doctoral scientists to do it, and allow them to do it.

Example of Applying Precursor Engineering to Medical Therapy

We now speak of a future medical capability that can benefit all humanity. It can follow directly from Evans' work {23}, and the effect has already been proven experimentally in France in the 1960s ^[24]. Until now, however, its free alteration of the cellular regeneration system's precursor bioengine has remained a total scientific mystery because it lies outside the conventional classical EM model. That model, of course, erroneously excludes the precursor engine and gauge freedom.

Visualize a biological system and its dynamics, such as the human body in all its complexities. All the body dynamics may be visualized as a great special "bioengine", which consists of,

(1) the precursor engine—that set of precursor causes (the structured bioenergy we refer to as massfree biofields) interacting with the body charges and masses at every level

(2) the bioforce engine produced as a result of those precursor interactions and dynamics

The bioforce engine is secondary, and it consists of two interacting parts:

(1) the precursor bioenergy engine—i.e., the virtual particle fluxes of the local vacuum/ST curvatures and their exact specific dynamics, interacting with the body charges and masses at every level

(2) the resulting biosystem and its dynamics at every level

The massless precursor bioenergy engine continuously interacting with the physical system produces the force bioengine and its dynamics as the resulting effect of that interaction. Note that the primary (precursor) causal bioengine is not comprised of forces until it interacts with the physical matter of the body and generates the resulting bioforces as primary effects produced in the body. In that ongoing interaction, all bioforces everywhere in the body, at every level, are generated by the precursor bioenergy engine interactions.

It is strongly stressed that this makes a profound and fundamental change to biophysics: Instead of seeking fundamental bioforces (force bioengines) of nature as primary causes, one now seeks fundamental precursor bioenergy engines as primary causes. The great impact is that it requires little or no work to engineer the master precursor bioengines at will, in any fashion desired. In simple language one directly engineers and structures the primary bioenergy (the biofields) and its dynamics, then that structured bioenergy and dynamics interacts on and with physical biosystems containing mass, to freely produce the desired bioforce engine and thus any conceivable kind of physical change of the biosystem. It can, e.g., induce stabilization and maintenance of the cellular system in any conceivable form desired.

Simply put, bioenergy fields interact with biomass of the biological system, producing all bioforce fields, physical biosystem dynamics, and physical functioning.

Structuring and Changing the Precursor Bioengine

We examine the structuring of the precursor bioenergy engine and how to freely change it at will.

It can be shown from Whittaker's work in 1903 and 1904 ^[25] that this precursor "bioengine" is naught but a complex set of longitudinal EM waves with added differential functions. Any scalar potential decomposes into a harmonic set of bidirectional phase conjugate longitudinal EM wave pairs (Whittaker 1903), and any field or wave pattern decomposes into two such scalar potentials with differential functions imposed. Hence all normal EM potentials, fields, waves, etc.—including those in biological systems—decompose into a far more primary electromagnetics comprised of longitudinal EM wavesets and their differential functions. Further, this more primary electromagnetics is directly engineerable.

As an example: For a given living body, there is a precise bioforce engine ongoing for that body in its intended healthy state. Hence there is a precise precursor bioenergy engine for that body also, in its intended healthy state.

For any disease or disorder change in that body whatsoever, there is an exactly specific delta precursor bioenergy engine for that disease change and all its actions and interactions, now present and also acting on

the body to its detriment.

For any disease-specific delta precursor bioenergy engine, there is a specific precursor bioenergy antiengine. The antiengine can be made and amplified by pumping. By introducing the amplified precursor bioenergy antiengine, a specific amplified bioforce antiengine is produced. This bioforce antiengine then acts upon the biosystem, specifically reversing the detrimental condition and healing the biosystem.

In other words, a damaged body has a damaged bioforce engine, consisting of the normal bioforce engine and a delta bioforce engine added to it. Hence the damaged body is being continuously interacted by a damaged precursor bioenergy engine, consisting of the normal precursor bioenergy engine and a delta precursor bioenergy engine added to it.

It follows that, if one were to time-reverse (phase conjugate) the total precursor bioenergy engine of the damaged body, the new precursor "bioenergy antiengine" would consist of two parts:

(1) the amplified time reversal of the normal precursor bioenergy engine—which antiengine would just tend to make the body cells, etc. a bit younger

(2) the amplified time reversal of the detrimental precursor delta bioenergy engine, which antiengine would gradually erase that detrimental precursor bioenergy engine and the disease itself!

Though simply put, that is in fact the mechanism used by the human cellular regenerative system (very poorly studied!) that generates the healing process in the body. It has long been obscured in biology by use of the terms "differentiation" and "dedifferentiation" of cells. Those terms refer to effects, not primal causes.

Becker's Important Work

Becker, e.g., clearly showed that potentials placed across intractable bone fractures directly generated such effects in red blood cells entering the injury site ^[26]. First the cells "dedifferentiated" back to an earlier form, growing a nucleus and shucking their hemoglobin. Then these new cells "differentiated" forward to form the type of cells that make cartilage. Then those cells further differentiated forward to form the type of cells that make bone. The resulting bone cells were then deposited in the fracture site to heal the fracture.

Becker received multiple nominations for a Nobel Prize for this incredible work. He also attempted to model the cellular regenerative system itself ^[27], using the normal EM model—which failed him because it cannot model the precursor bioenergy engines at all. Had Becker had access to Evans' present work, he would have produced a gigantic revolution in medicine, and would have very probably been awarded a Nobel Prize. The bone healing work did survive quietly, and today it is used in a number of hospitals to continue to treat and cure otherwise intractable bone fractures.

We again stress that, using free asymmetrical regauging, the precursor engine and antiengine can be directly amplified, essentially work-free. One pays for a little switching and timing for control, but pays nothing at all for the excess energy utilized and structured and controlled, which is pure regauging. Regauging to increase the energy is pure negative entropy engineering, not previously recognized or utilized.

Precursor Bio-Engineering Was Demonstrated in France

The precursor engine, antiengine, and amplification approach was in fact demonstrated experimentally and rigorously in France by Antoine Prioré, although he was unaware of its nature. His work was personally presented to the assembled French Academy by its Secretaire Perpetuel, Dr. Robert Courier ^[28].

In the 1950s and 1960s, working with eminent French scientists, Antoine Prioré discovered how to directly amplify the "cellular regenerative" process in the laboratory. In short, he unwittingly discovered how to form antiengines for specific diseases and disorders, amplify the antiengines, apply them to the body, and directly heal the body via the resulting "amplified cellular regeneration" process.

Prioré used a huge plasma tube fed with a mix of transverse EM waves, unwittingly using a characteristic of plasmas that can transduce transverse waves to longitudinal EM waves ^[29]. Hence he had introduced a longitudinal EM wave structure inside the plasma, adding to its field structures. With a large coil around the plasma tube, he produced a large rippling magnetic field whose inner "Whittaker structure" was deliberately modified (by controlling the frequency, and phasing of transverse waves induced in the plasma). The amplified bioenergy antiengine was embedded inside the longitudinal EM wave Whittaker structure of that rippling magnetic field.

Unknown to practical plasma technicians and to classical electrodynamicists, in quantum field theory the longitudinal photon and the time-polarized (scalar) photon exist and are individually nonobservable. However, their combination is observed as the instantaneous scalar potential—i.e., as common voltage. This tells us that, when we produce voltage, we produce not only Whittaker's 3-spatial longitudinal waves, but also their time-polarized (scalar) counterparts also. In short, by subjecting an object to simple voltage, one subjects it to a special form of phase conjugation by optical-type pumping. The "input" to the pumping is the resident precursor bioenergy engine, and the output of the pumping (i.e., the "time reversed wave counterpart") is an amplified precursor bioenergy antiengine. The interaction of the amplified precursor bioenergy antiengine and the living body's mass produces the amplified bioforce antiengine that physically reverses the disease.

Suddenly Becker's work with voltage and its unexpected generation of radical change of red blood cells into new kinds of cells comes alive, because something magical was truly going on in the use of a simple potential across a fracture site (pulsing enhances the effect also). That potential was comprised of longitudinal EM waves and scalar EM waves (time-polarized EM waves) in combined phase conjugate pairs, slightly altering Whittaker's 1903 and 1904 work. So in nonlinear optical terms, Becker was "pumping" those red cells (and the fracture vicinity) in both the time domain and the 3-space domain. He thus time-reversed both the 3-space longitudinal wave components and the time-polarized scalar wave components. The result was to produce an amplified time-reversed precursor "engine" (i.e., an antiengine) of the resident precursor bioengine actually present in, and acting on, that body to produce its resident force bioengine! This accounted directly for the much more rapid cellular dedifferentiation and redifferentiation effects, compared to the relatively slow and much weaker effects achievable by the feebly amplified cellular regenerative system.

Surrounding Prioré's plasma tube was a very large coil, which—stimulated by the plasma—then produced an oscillating magnetic field that further contained in its Whittaker longitudinal EM wave internal composition that "engine" that Prioré had caused to be introduced. The patient then laid on a table under the magnetic field beam, and the entire body was bathed in this emission. The rippling magnetic field insured that the internal "amplified precursor bioenergy antiengine" was carried down to even the bone marrow cells of the body, affecting everything. As proved for millennia in the living body, if the carried "engine" is the antiengine of the specific disease, then this produces an amplified bioforce antiengine that is directly an amplification of the body's own cellular regeneration mechanism for healing that disease.

The rippling magnetic field carried the "internal new precursor antiengine" to all parts of the body, even through the bone marrow to the primitive cells, etc. Thus the total force engine of the body was directly altered, leading to physical changes in the body that reversed the specific disease and healed the patient. Thousands of rigorous lab animal experiments were performed and are duly reported and documented in the French medical literature^[30]. As many researchers have suspected, when the body is sick, it is "sick all over", since the disease "precursor bioengine pattern" is in all the potentials and fields of the entire body, at every level.

Prioré's method added a new and amplified "antiengine" to the diseased body's own precursor engine, in turn directly altering the body's own force engine responsible for maintaining its present state and dynamics containing the physical disease. He simply reversed the body from a "diseased state" back to a "normal state". Hundreds of cases of terminal tumors, certain infectious diseases, clogging of the arteries, etc. were cured in laboratory animals, in some of the most sensational medical research of all time.

Results Obtained by Prioré's Method

When the added amplified bioengine was the reversal or near reversal of the detrimental bioengine portion already in the body, this process reduced and eliminated the detrimental delta bioengine, within the limits that the scientists had learned how to adjust the input signals for a given disease.

Consequently, unparalleled healing of disease occurred, in thousands of laboratory animal experiments rigorously performed at the University of Bordeaux by famous French scientists such as Raymond Pautrizel^[31],^[32]. Dr. Robert Courier, *Secrétaire Perpetuel of the French Academy* and head of its biology section, personally presented the astounding results of the Prioré work to an assembled and stunned French Academy^[28]. Terminal cancers, some specific infectious diseases, atherosclerosis, etc. were cured with alacrity and remarkable effectiveness. The results were so astounding that they caused a sensation in France and in some other scientific communities also. Sadly, there was not a single scientist available anywhere openly, who had developed or even knew of the science of engines and therefore might recognize and state the mechanism used in the Prioré work.

The Prioré team also experimentally showed that the internal patterns or "internal precursor engines" inside a given EM field or potential (in its Whittaker decomposition) do diffuse from one potential or field into another that is superposed, and these internal precursor engine changes remain there and only gradually diffuse away over a period of time (such as a few weeks or months).

It was shown that a drop of blood—taken from a rat successfully healed of a terrible terminal cancer—could then be injected into another rat with the same disease, and that rat would also start to get well and get rid of the cancer. This "pass it along" precursor bio-antiengine diffusion effect lasted for some weeks. But the experiments clearly showed that the necessary "antiengine" had been created in the original treated rat, and that it was actually present everywhere in that rat, in its blood and elsewhere, and only gradually "dissipated" by diffusion reactions as time passes. It also showed that transferring some of the blood containing the new bio-antiengine spread the bio-antiengine into the receiving animal.

This work is all documented in the hard French scientific literature. It has required 30 years for the present author to even be able to explain the primary mechanism.

The End of the Prioré Work

The Prioré group itself (and the French scientific community as well) could not understand the mechanism because they only had the flawed old Maxwell-Heaviside theory to apply. That theory cannot model the elemental precursor engines, how they produce the force engines, and how such operations are the key to the healing process itself. Consequently, today we still have a medical science using the highly obsolescent electrodynamics of more than a century ago. Present medical therapeutics largely deals with killing and removal processes (such as the immune system's warlike work), while almost totally ignoring the actual healing mechanism and regenerative system of the body. Medical science has thus produced a largely "intervene and destroy" therapeutics, with the real healing work then largely just "left to the body" in the hopes that it can somehow do the regenerative job required after the destruction and intervention.

The Prioré work showed that, not only can that fundamental cellular healing process be used in advanced new technology, but it can be highly amplified to allow very rapid healing of dread diseases. The Prioré work was ruthlessly suppressed in the mid-70s when the French government changed to a leftist government and quit funding the work. In 1984, not long after Prioré's death, the University of Bordeaux did accept a doctoral thesis on that work by one of its students (Perisse)^[32b]—after having been forced to reject Prioré's own doctoral thesis^[33] in the early 1970s.

So a great medical cure for cancer, hardening and clogging of the arteries, infectious diseases, etc. was brought to the very brink of being born and utilized, and by the proper scientific community. Then because of the lack of a proper physics and electrodynamics model, it could not be scientifically understood. So, sadly, it was strongly opposed and "parked on the shelf" primarily because there was no available electrodynamics known to the scientists that would allow modeling and development of a total technology including both theory and application. The French government and the French scientific community continue to strongly oppose the Prioré work to this day.

Electrodynamics Must be Modernized

The Prioré case is one dramatic example among many, of how the present terribly inadequate model of electrodynamics (used in electrical engineering) has long inhibited our scientific progress by blocking the development of precursor engineering and negative entropy engineering. That terribly flawed model and its continuing use are also directly responsible for the deaths of hundreds of millions of persons worldwide who did not have to die, had a better EM model been available and used, and had the scientific community not continued to adamantly propagate and uphold such a seriously flawed EM model.

The source charge solution^[14] also entails a coming great impact on thermodynamics. The charge continuously consumes positive entropy (disordered energy) in the active vacuum's virtual state, coherently integrates it, and produces negative entropy in the observable universe by continuously re-emitting the ordered energy (real observable photons), by a now-specified self-ordering criticality process specified by the present author. The resulting macroscopic EM fields and potentials produced and continuously maintained while spreading at light speed are ordered as a function of radial distance.

There are no “static” EM fields and potentials anywhere in nature! Instead, there are steady-state flows of EM energy that establish and continuously maintain steady state dynamic EM fields and potentials, in the sense explained by Van Flandern as follows ^[34]:

“To retain causality, we must distinguish two distinct meanings of the term ‘static’. One meaning is unchanging in the sense of no moving parts. The other meaning is sameness from moment to moment by continual replacement of all moving parts. We can visualize this difference by thinking of a waterfall. A frozen waterfall is static in the first sense, and a flowing waterfall is static in the second sense. Both are essentially the same at every moment, yet the latter has moving parts capable of transferring momentum, and is made of entities that propagate.

Hence every charge in the universe is a nonequilibrium steady state (NESS) system, continuously consuming positive entropy (disordered energy) of the virtual particle flux of the vacuum and producing negative entropy (ordered energy) of its macroscopic EM fields and potentials, along the lines theoretically shown by a startled Evans and Rondoni ^[13]. The original charges have been producing negative entropy steadily for some 13.7 billion years, and they are still continuing.

The use of STC/VPF engines as precursors to forces and to material dynamics, thus opens an exciting and more fundamental vista for the environmentalists: The vision of a new kind of engineering in science and the electrical power industry. The breathtaking capability is to develop and use a negentropic engineering that will replace the old entropic engineering that has so sorely poisoned our planet and damaged our biosphere. The present entropic form of the Second Law is and always has been an oxymoron implicitly assuming that its own contradiction has first occurred. This total falsification of the present second law by the source charge completes the work of falsifying that law—work that is ongoing by D. Evans and his colleagues ^[35] and by many others. It also solves the century-old, vexing “time asymmetry” problem of thermodynamics, because negentropic processes are now permitted and experimentally validated.

Conclusion

As one can see, there is a marvelous new science of the future already in sight, desperately trying to get born. To be born, however, there must exist a growing recognition and use of higher group symmetry electrodynamics and application of a unified field theory that is engineerable by these unusual electrodynamic means. There must accordingly be a growing recognition of the very few great pioneers in this field. Most of all, there must be funding of doctoral programs and post doctoral programs in the area of precursor engineering for negentropic processes and systems.

When this is accomplished, a revolutionary new science of precursor engineering will be born. The positive impact on humanity, the biosphere, and the progress of science will also benefit untold generations yet unborn, from now throughout all the foreseeable future of humankind.

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that emerge are equal and opposite. Thus they sum to a vector zero resultant. There is thus no net force field which can be used to push current against impedance, to dissipate the free excess system energy to perform work in a load. Instead, the excess free regauging energy is "locked up" as a change in the stress of the system—as stress energy. So the electrodynamicists arbitrarily discard that entire class of Maxwellian systems which asymmetrically regauge by changing their own potential energy and also producing a net nonzero force field along with it. In short, the electrodynamicists deliberately assumed away all the Maxwellian systems which can freely produce coefficient of performance (COP) of $COP > 1.0$.

[7]. Ubiquitous use of the closed current loop circuit with the "external" power source in it, rigorously enforces symmetrical regauging, since the circuit equalizes forward emf in the external circuit and back emf inside the dipolarity of the generator. Hence half the energy collected in the external circuit is used to destroy the dipolarity of the generator, while the other half is dissipated in the external circuit's losses and the load. To restore generator dipolarity, one must input to the shaft of the generator at least as much energy as was dissipated in destroying the dipolarity. And this input energy will thus be greater than the amount of energy dissipated to power the load. Such a circuit thus self-enforces $COP < 1.0$.

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How An Electrical Circuit is REALLY Powered Bearden for Dummies

Date: Wed, 21 Nov 2001 19:38:06 -0600

Here's a simple explanation of what powers every electrical circuit.

When we crank the shaft of the generator and rotate it, the rotation transforms the input "mechanical" energy into internal "magnetic field" energy. In that little part of the circuit that is between the terminals of the generator and inside it, the magnetic field energy is dissipated on the charges right there, to do work on them. This work (expending the magnetic energy) forces the negative charges in one direction, and the positive charges in the other direction. In copper, for example, for every electron we "push" off an atom into the conductor as a free electron to make "current", there is a "hole" left on that atom. That "hole" is a positive charge.

So the same magnetic field energy, while moving those electrons, also applies forces to those positive holes. The positive charge of each hole, however, is attached to a far heavier mass (the atom) than is the charge of the electron. So the atoms with positive charges (ions) are pushed and rocked back a little.

That's all that rotating the shaft of the generator accomplishes. None of that input shaft energy was transformed into EM energy and sent out down the powerline, as electrical engineers assume. Not to worry, energy does get sent down the powerline. But not from the generator shaft energy or its transduction.

Essentially then, all the energy we put into the shaft of the generator is dissipated inside the generator itself, to push the positive charges in one direction and the negative charges in the other.

The separation of the charges forms what is called a "dipole" (opposite charges separated from each other a bit).

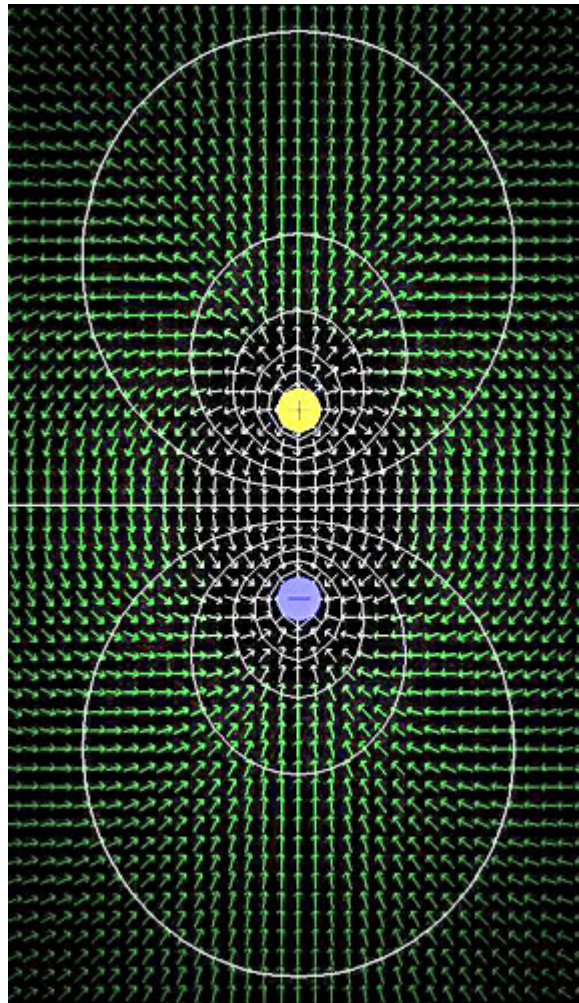


Diagram of a physical dipole,
with equipotential surfaces and field lines indicated

That is all that the generator does. That is all that burning all that coal or oil or gas does.

It heats a boiler to make steam, so that the steam runs a steam turbine attached to the shaft of the generator, and turns it - and therefore forcing those charges apart and making that dipole between the terminals of the generator.

Generators and batteries make source dipoles, nothing else.

Let's stop right there and see what happens, once we have a dipole.

In 1957, Lee and Yang were awarded the Nobel Prize for the discovery of broken symmetry, including the broken symmetry of opposite charges (such as the ends of a dipole, like between those terminals of that generator). Ugh! In lay language, what the dickens is that? What does it mean? Let us deviate a little, so we understand what has been said when we say that "the dipole, once made, is a broken symmetry in the fierce energy flux of the vacuum".

In quantum mechanics, the vacuum (*empty space*) is not inert at all, but is one of the most active and energetic things in the entire universe. Imagine a giant sea of "energetic bubbles", boiling up and bursting, and with mind-boggling energy. Each little bubble arises and disappears so quickly that it cannot be individually seen; but during the moment that it exists, it has enormous energy.

The vacuum or so-called "*empty space*" is just a seething sea of such extraordinarily energetic bubbles of energetic particles appearing and disappearing at an incredible rate. Because an individual bubble cannot be seen, it is said to be "virtual" (*not observable*) as compared to something that hangs around a long time and thus can be "seen" or "observed". An ordinary old electron that hangs around all the time is thus observable; an

electron born as a special "bubble" momentarily in the seething vacuum and disappearing again almost instantly, is not observable but "virtual".

Photons (pieces of electromagnetic energy) also come in both "observable" and "virtual" size. An ordinary old photon hangs around a long time and so it is observable. We say it is "*real energy*" because we can interact with it, detect it, and observe it. A photon born momentarily as a "special bubble" in that seething vacuum does not hang around, and so cannot be "seen" or measured or observed. So it is said to be "virtual".

These virtual bubbles appearing and disappearing in the vacuum are quite real. The reactions of lots of them with mass is what creates all the forces of the universe. Any and every kind of force.

It turns out that a charge - any charge, either electric or magnetic - is in violent virtual photon energy exchange with that vacuum, continuously. That fierce absorption of energy and emission of energy is in fact "what charge really is".

Let's visualize that as virtual photons (photon bubbles) in the frenzied vacuum continuously interacting by the uncountable zillions with an ordinary old charge (say an electron). All the forces we observe acting upon that electron, are created by the frenzied interaction of those virtual photon bubbles with that electron.

And the same for any other charge.

So a dipole (two opposite charges separated a little) is a broken symmetry in that violent energy exchange between the charges of the dipole and that seething energy bubble sea. That is well-proven, both experimentally and theoretically, in particle physics since 1957 and the award of the Nobel Prize to Lee and Yang.

It still hasn't made it into the electrical engineering textbooks and curricula yet.

Here's what we mean by that "broken symmetry of the dipole in the fierce flux of vacuum".

The charges on the dipole continuously receive energy in little temporary "bullet strikes" called virtual photon absorptions. So the charge continuously absorbs EM energy, steadily and violently, from the active vacuum at an incredible rate. All the time. Night and day. More in one second than all the manmade power systems on earth have used in our entire history. In other words, it really receives an incredible amount of energy continuously!

So the dipole has to re-radiate (emit) that continuously absorbed virtual energy back to the active vacuum, as fast as it receives it. Else its rapidly increasing stored energy would rise so sharply that it would create a new "Big Bang" and an entire new universe bursting out of the old one.

Obviously the world is not continuously exploding around every dipole or electron. In fact, the dipole and the electron are quite stable. So the dipole or electron has to be re-radiating that absorbed energy back to the vacuum as fast as it receives it.

Now there are two ways the opposite charges in a dipole could possibly radiate that energy back to space.
(1) they could radiate it back as the same kind of virtual photons that it absorbed. In that case, there would exist "mirror symmetry" in the vacuum flux, as if everything hitting the dipole charges from the vacuum were just reflected exactly right back to the vacuum, like light reflecting perfectly from a mirror. But that's not what happens. What happens is,
(2) a lot of the little bitty momentary photons are "piled up" and added together, to make a bigger "chunk" of EM energy. These "big chunks" of EM energy are the bigger, permanent kind of photons! They are observable. That's real energy, and you can intercept it, collect it, and use it to power real loads. That reradiating the absorbed virtual photon energy as observable photon energy called a "broken symmetry" in that vacuum "bubble flux". In other words, the dipole charges absorb energy from the vacuum in very tiny momentary bits - as something like "disintegrated" EM energy. But the spin of the charges of the dipole integrates that "disintegrated" EM energy into very much bigger pieces that are permanent and hang around. So part of the energy received from the vacuum in a form that cannot be "seen", is "glued together" into energy that can be and is seen, and re-emitted back to the vacuum in that real EM energy form.

So we "see" the dipole as if it were just sitting there and pouring out real EM energy continuously, in all

directions, like a spray nozzle or giant energy gusher. We don't see the input energy from the vacuum at all! But it's there, and it's well-known in particle physics. It's just that electrical engineers - particularly those that have designed and built all our electrical power systems for more than a century - do not know it.

So, according to proven particle physics and a Nobel Prize, the easiest thing in all the world is to extract EM energy from the vacuum. All you wish. Anywhere in the universe. For free. Just pay a little bit once, to make a little dipole, and that silly thing is like a great oil well you just successfully drilled that has turned into a mighty gusher of oil without you having to pump it. The dipole just sits there and does its thing, and it pours energy out forever, for free, as long as that dipole continues to exist.

So pouring from the terminals (from the internal source dipole) of every generator and battery, there is a stream of EM energy pouring out, once that internal dipole is made. This outflowing EM energy has been extracted and converted directly from the seething vacuum by that dipole's broken symmetry. The outflowing EM energy is not transformed shaft energy one put into the generator! That flow of energy extracted from the vacuum fills all space around the external wires attached to the terminals, and it flows at the speed of light.

The external (attached) circuits and power lines etc. catch some of that available EM energy flowing through space (generally flowing parallel to the wires but outside them). Some of the flowing energy is intercepted and diverted into the wires themselves, to power up the internal electrons and force them into currents, thus powering the entire power line and all its circuits.

However, the power system engineers use just one kind of circuit. In the standard "closed current loop" circuit, all the "spent electrons" (spent after giving up their excess energy in the loads, losses, etc.) are then forcibly "rammed" back through that little internal section between the ends of the source dipole (between the terminals). These "rammed" electrons smash the charges in the dipole away, and destroy the dipole then and there.

It can easily be shown that half the "caught" energy in the external circuit is used to destroy that source dipole, and nothing else.

For more than a century, our misguided engineers have thus used a type of circuit that takes half of the energy it catches, and uses that half to destroy the source dipole that is actually extracting the EM energy from the vacuum and pouring it out of the terminals for that power line to "catch" in the first place! The other half of the "caught energy" in the powerline is used to power the external loads and losses.

So half the caught energy in the power line is used to kill the source dipole (kill the free energy gusher), and less than half is used to power the loads. It follows that our electrical engineers are trained to use only those power circuits that kill themselves (kill their gushing free energy from the vacuum) faster than they can power their loads.

Well, to get the energy gusher going again, the dipole has to be restored in order to extract the energy and pour it out again.

So we have to pay to crank the shaft of that generator some more, to turn that generator some more, so that we can dissipate some more magnetic energy to re-make the dipole. We have to work on that shaft at least as much as the external circuit worked on that source dipole to destroy it. So we have to "input more shaft energy" to the generator than the external power system uses to power its loads. Since we pay for the input shaft energy, we have to keep on burning that coal, oil, and gas etc. to do so.

All our electrical power systems are "suicidal" vacuum-powered systems, freely extracting their useful EM energy from the seething vacuum, but deliberately killing themselves faster than they power their loads.

All that the burning of all that coal, oil, gas, etc. accomplishes is to continually remake the source dipole, which our engineers insure will then receive be killed by the system itself faster than the system gives us work in the load.

To borrow a phrase from Tesla, this is probably "the most inexplicable aberration of the scientific mind ever recorded in history".

No electrical engineering department or professor in the United states teaches or even knows what powers an EM circuit, or an electrical power line, even though the basis has been available in particle physics for nearly

half a century.

All that wanton and senseless destruction of the biosphere and pollution of the planet, just to get our electrical energy from self-suicidal power system, is insane. There is absolutely no need for it. That hundreds of thousands of engineers and scientists have continued this gigantic farce uncomplaining, is absolutely inexcusable. That the leaders of our scientific community continue to propagate such nonsense, is also inexcusable.

There is no problem in getting all the EM energy one wishes, for nearly free, anywhere in the universe, and that follows from the broken symmetry of the dipole. Just make a dipole. You get the energy flow for free, thereafter, so long as you will just leave that dipole intact and not destroy it (or at least destroy it slower than you power the load).

All the universities, the *National Academy of Sciences*, the *National Science Foundation*, and the great national laboratories are completely working on the wrong end of the energy problem. So is the *Department of Energy*, save one small project to donate a website to the Alpha Foundation's Institute for Advanced Study (AIAS), of which the present author is a fellow emeritus (old dog). The conventional power system scientists have got the cart before the horse, have had it that way for more than a century, and are determined to forever keep it that way.

The real and only energy PROBLEM is simple:

- Figure out better mechanisms to intercept that FREE electromagnetic energy flow from the source dipole, once made
- Collect lots of that freely flowing energy in collectors and circuits
- Then discard the stupid closed current loop circuit and dissipate the collected energy in the loads WITHOUT dissipating half of it to kill the dipole and the free-flowing EM energy from the vacuum

In one AIAS paper, we gave some 17 ways to attack that real only energy problem. Several of those ways are doable now, but just require funding and a proper development program. And some engineers who also know some particle physics. I personally know three inventor or inventor groups with overunity EM systems in at least successful laboratory experiment, or in actual prototype. Our own group with its motionless electromagnetic generator using the *Aharonov-Bohm effect* is one of those three systems that can be developed and brought into mass production within one year, given adequate funding (say, about 23 million per system). The energy crisis can be totally solved, forever, anytime the scientific community will permit it, fund it, and not try to "steal" it from the inventor(s).

The electrodynamics that U.S. electrical engineers are using to design those present electrical power system monstrosities and the accompanying extraordinarily vulnerable and awkward and archaic infrastructures and distribution systems is 137 years old, put together in the time of the American Civil War, for goodness sakes! At that time, the atom, the nucleus, and the electron were not even discovered yet. The classical EM model is known today to be seriously flawed (e.g., Wheeler and Feynman pointed part of it out, and even tried to correct it. They failed because their corrections were not sufficiently extensive). Even so, later even that 1865 Maxwellian EM model was also seriously curtailed in the 1880s (after Maxwell was already dead).

It was further crippled, first partially crippled by Heaviside and then permanently crippled (as far as free energy systems) by Lorentz. Prior to Lorentz's changes, the Maxwell-Heaviside equations do prescribe both,
(1) Maxwellian systems that put out less energy than the operator inputs (i.e., the conventional stuff)
(2) Maxwellian systems that put out more energy than the operator himself inputs.

The model (before Lorentz's changes) does include "electromagnetic windmills in a free electrical wind", so to speak. After *Lorentz's change*, it is as if the further-stripped model now only contains "windmills which are sealed in a barn so no wind can ever get to them".

Let me put it this way. Every electrical system we ever built, and every one today, is powered by EM energy extracted directly from the active vacuum by the source dipole in the system. Always has been, always will be. If one really wants to get serious about it, all EM energy in space comes from the time domain (see my *Giant Negentropy* paper). Literally we "consume or use a little time, to get EM energy in 3-space. One second of time converts to something like 9×10^{16} joules of EM energy. So if we convert one microsecond per second, at one point in space, into EM energy in space, we get something like 9×10^{10} joules per second - that's 90,000 megawatts at that single point. Even at a very efficient conversion process, we can get 1,000 megawatts there at that single point or location. And we can simultaneously do that at each and every spatial point or location that we choose.

So how many programs are the *National Academy of Sciences* and *National Science Foundations* funding for working on the only real fundamental electrical power system problem (how to dissipate the freely flowing EM energy in loads, without ramming the spent electrons back through the source dipole and destroying it)? Check their websites. There is no really "*innovative science*" going on to solve that problem. The scientific community will spend and has spent billions on the notion of hot fusion, without adding one watt to the power grid, but they will not spend a paltry \$40 million to solve the only remaining problem that would allow very cheap and clean electrical energy for the entire world, forever. And that would dramatically and permanently reduce the despoiling of this beautiful biosphere, the strangling of species, and the global warming. Let alone eliminate those nuclear powerplants and eliminate further nuclear wastes from them.

The cost of a single large new electrical power plant for a few years, can solve the energy crisis forever.

Kyoto was a flash in the pan prior to what can really be done with a single well-funded and well-directed research program in 3 years. We could have working commercial power systems, self-powering, going into production in one year from the date such a program is initiated, if we can get something like a *Presidential Decision Directive* to keep the infuriated scientific community, the *Big Nuke Power* boys, and the *Big Oil and Big Coal* boys off our backs. Two years later that that first year, the range of systems will include nearly everything necessary to permanently replace this terribly vulnerable and antiquated centralized power system that is going to require vast billions of new dollars and years of work, just to try to stay up with demand.

Oh, how long will a dipole pour out that EM energy freely, you asked? Let's put it this way. The dipoles in the atoms of all the primary matter in the universe, have been continuously pouring out EM energy freely extracted from the vacuum, for some 14 billion years or so. So as far as we are concerned, the dipole will pour the energy out freely forever, or for at least the next 14 billion years - and that's close enough to forever for government work, so to speak.

All we have to do is take the "electrical windmills" out of the closed current loop barns we have been putting them in for over 100 years.

If the environmentalists really want to save the planet, then it is the scientific community they should be attacking and condemning. To do that, they will have to have some decidedly unorthodox scientific advise. But we do have some extraordinary scientists who can and would do it. They would have to be paid, but they can meet all objections and the deepest scientific criticism.

The global warming, hydrocarbon combustion pollution, nuclear power plant pollution, and dams pollution and degradation of species and the biosphere, are totally unnecessary. The only reason we have an environmental problem now approaching such epic proportions, is because of the abject and total failure of our own scientific community for more than a century. That was excusable for a half century, but since the rise of particle physics - and specifically since the discovery of broken symmetry - it is no longer excusable. Indeed, it so threatens the very survival of the United States (and about 3/4 of the Earth that is going to be destroyed by about 2010 on our present course) that it has become simply inexplicable.

How else can one explain the fact that, in 100 years, we have not produced a single electrical engineering department, university, national laboratory, etc. that even understands what powers an electrical circuit? And still do not, even though the broken symmetry of the common source dipole has been established for nearly a half century?

The organized scientific community --- not the political community --- is totally responsible for the environmental crisis.

Unfortunately, the environmental community and the political community have been very naïve; they have turned for their "expert advice" to those same engineers and scientists and organizations and laboratories that do not even know what powers an electrical circuit. And that have been responsible for the crisis in the first place. And they have naively believed every word they were told by those advisors.

Hey! Those who brought on the problem in the first place, and who so stoutly defend the present mess (destroying the careers of scientists who object and try to change it), cannot be depended upon to properly advise anyone on how to correct it. That is like setting the fox in the henhouse to guard the hens.

The environmental community does a lot of activism, because it is filled with persons sincerely passionate in their urgent intent to save this precious planet. The community has a lot of clout, and it also attracts a lot of money from donors wishing to clean up the biosphere, and to have a clean air and planet once again, with thriving natural species rather than species strangling in the sludge and the mud.

However, sadly the community focuses (understandably!) on the wrong problem, because it receives the wrong scientific advice. The environmental community is led to believe that what is being done by our energy scientists and engineers is the very best that can be done. That is totally false. Both the environmentalists and the politicians are being misled by our scientific community.

Contrary to popular opinion, science does not progress by sweet reason, but by an unending series of cur dog fights. Any historian of science can give dozens and dozens of notorious examples (vacuum energy and cold fusion are two present cases where the innovative scientists are being savaged without mercy). The Big Dogs who hold the upper hand in the present cur dog fights, are irrevocably committed to more of the same systems the environmentalists despise:

- big nuclear power plants
- more hydrocarbon burning
- ever more oil and gas pipelines
- ever more dams, etc.

You cannot power the big cities and the increasing populace with windmills and solar cells. Or with fuel cells either, though that is now the "decision" made by the various cartels that we shall have forced upon us.

Reason:

with fuel cells, you will have to keep burning some fuel, and keep that energy meter on your house and some kind of "gas meter" on your car. EM energy from the vacuum is deadly opposed by the cartels because it is total anathema to that desire. By removing that gas meter on your car and that electric meter on your house, some vast financial empires are threatened and will be destroyed eventually. We simply wryly point out that the top dogs did not get on top by placing touch football; they got there by playing very hard-nosed football. They will do whatever it takes to oppose the knowledge and funding of COP>1.0 electrical systems freely taking their energy from the seething vacuum. Including kill the inventors and discoverers as necessary. They have been doing it for several decades already.

So the dispute over eliminating the energy crisis versus saving the environment then becomes artificially limited to the false "either-or" choice between more energy-systems-as-conventional to provide more energy, versus severe curtailment of energy use from less energy-systems-as-conventional to decrease the impact on the environment.

That choice forces one to a choice in the national economy and way of life, when only the conventional power system technology is considered. With conventional technology, to maintain the economy for a decent standard of living for all, we have to have CHEAP AND ABUNDANT electrical energy and more of it every year. With conventional approaches, to maintain the environment we have to have CLEANER AND LESS electrical energy every year.

The real solution is to kill the controversy and cut the Gordian knot, and get rid of that phrase "conventional power system technology" and that phrase "and less". To do BOTH things at once - have cheaper, clean, and more abundant electrical energy and more every year - we only have to turn to proper use of the enormous electromagnetic energy so easily and universally produced from the seething vacuum.

There is a very good and proper science of the type of electrodynamic models that have to be used to develop such new "vacuum powering" systems:

- (1) higher group symmetry electrodynamics should be used, such as $O(3)$, which is capable of modeling the vacuum interaction as well as the curvatures of spacetime interactions (both of which conventional classical electrical engineering discards), and
 - (2) we have to put some sharp but open-minded scientists on working on the real problem: how to dissipate the collected EM energy in a dipolar circuit, without using half of it to destroy its own dipolarity.
- We have to fund those sharp young grad students working on their doctorate, and those post-docs working on new energy research, to work in "EM energy from the vacuum". Try finding a single doctoral thesis, candidate, or post-doc working on a funded project in that respect.

The entire solution to the energy crisis and to the environmental problem due to energy is doable, and it's

doable in three years. But take an example: To get those two things going via our own proposed COP>1.0 power system (the motionless electromagnetic generator), we have had to move our final year of research to the *National Material Sciences Laboratory* of the *National Academy of Science* of a friendly foreign nation.

Which, by the way, has been teaching the higher electrodynamics in its universities now for more than a dozen years.

And which, by the way, does know what really powers an EM circuit.

Hope this fills the bill for you.

Best wishes,

Tom Bearden

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Subject: Re: RE: Please Forward to Tom Bearden

Date: Wed, 21 Nov 2001 02:15:20 -0500

Dear Mr. Tom Bearden,

Thank you for your quick and courteous response to my email. I truly appreciate that you are willing to take the time to correspond with those of us who are fascinated with your research, but are obviously not anywhere your level of education or understanding of these concepts.

I have printed out some of the material on your website (especially "The Unnecessary Energy Crisis") and have passed it along to a friend of mine at school. I have also mentioned your website to a couple of my professors. My English teacher is a staunch democrat and has an intense devotion to environmental protection. I told her that if she wanted to truly know how the environment of this planet could be protected, she needed to read your website. She told me she would take a look at it.

I understand that you would have difficulty writing a paper both detailed, but also generalized. There is a huge amount of information about your concept, and it is not simple at all. But the most fascinating concept in my mind is the fact that **all** of the energy we use today does not come from coal, nuclear fuel rods, gasoline, or other similar sources. It comes from the zero point energy that is released when a dipole is created! Those other products only create the energy to separate the charges in the dipole, the ZPE field does the rest!

That in my opinion is a truly revolutionary concept. And I truly want to share it with other people! But my problem is that even though I grasp the **basic** idea of the theory, the technical aspects are beyond my understanding.

In my opinion someone needs to write a paper, "for dummies" so to speak, that is basically a tutorial on the **basic** theory of electricity, magnetism, and how power generation works. But this paper would also explain, MOST IMPORTANTLY, that all we humans have done is separate the dipoles and that ZPE does the rest. Then perhaps afterwards there could be an additional section with slightly more technical information, references, etc.

In my opinion to get the word out about this, we need such a document that lay people will be interested in reading. I am such a layperson, and I still enjoy reading your papers (even though I do not understand 90% or more of their content). But most people would look at them and cringe with fear, because honestly you are **way** above the rest of us.

If you would be willing to write such a paper I would be more than willing to distribute it at my college and to several of my online friends. And I know of other people on the internet that would be willing to do the same. I believe such a paper, could make a huge impact.

Your website has motivated me to start studying these subjects on my own starting next semester. I am going to try and start from the **very** basics (which I need to seriously study) and work my way up.

Also, I read your paper on the *Rife Microscope*. One of my more serious interests is biology and anti-aging research. I have been reading about subjects such as

- telomere shortening
- mitochondrial DNA deletions
- free-radical damage
- Advanced Glycation End product accumulation

...and so fourth for a few years now. One reason I went back to school is to eventually be able to find a way to reverse the human aging process, which I believe is the most horrible and cruel disease on this planet.

But if your information is correct, and we can simply reverse aging and disease with some type of ZPE energy, then perhaps I should major in physics instead of biology? To have a better understanding of this, what would be the most appropriate major?

Honestly, I have not yet grasped that concept. I just do not understand how applying some type of "energy" could reverse damage or modify purely biological functions. But if it is true, then basically your website paints the picture of a glorious utopia where energy is free and all disease and aging is a thing of the past.

And if this is all true (you have basically proven your point about ZPE, the biological aspect is just a little harder to grasp) then probably every extraterrestrial species is laughing at or on the other hand crying over us right now.

Again, thank you for your response. I hope you will consider writing up some kind of paper explaining the basic concepts behind magnetism, electricity, and power generation and then introducing the truth about vacuum energy. Such a paper would be *very* useful in sharing with others about this concept.

Take care and God Bless you. I hope you and your family have a fantastic thanksgiving!

Best Regards,

The Unnecessary Energy Crisis ...and How to Solve It Quickly

Introduction

The World Energy Crisis

The world energy crisis is now driving the economies of the world nations. Presently there is an escalating worldwide demand for electrical power and transportation, much of which depends on fossil fuels and particularly oil or oil products. The resulting demand for oil is expected to increase year by year. Recent sharp rises in some U.S. metropolitan areas included gasoline at more than \$2.50 per gallon already.

At the same time, it appears that world availability of oil may have peaked in early 2000, if one factors in the suspected Arab inflation of reported oil reserves. From now on it appears that oil availability will steadily decline, slowly at first but then at an increasing pace.

Additives to aid clean burning of gasoline are also required in several U.S. metropolitan areas, increasing costs and refinery storage and handling.

The increasing disparity between demand and supply — steadily increasing demand for electricity using oil products versus decreasing world supplies of oil, with other factors such as required fuel additives — produces a dramatically increasing cost of oil and oil products. Further, newer supplies of oil must be taken by increasingly more expensive production means.

At the same time, the burgeoning populaces of the major petroleum producers — and their increasing economic needs —press hard for an increasing inflation of oil prices in order to fund the economic benefits.

As an example, it appears that Saudi moderation of OPEC is vanishing or has already vanished. The increasing demands of the expanding Saudi Royal Family group and the guaranteed benefits to the expanding populace have overtaken and surpassed the present Saudi financial resources unless the price of OPEC oil is raised commensurately.

The Federal Reserve contributes directly to the economic problem in the U.S., since it interprets the escalating prices of goods and services (due to escalating energy prices) as evidence of inflation, and will continue to raise interest rates to damp the economy, further adding to suppression factors weighing on business, employment, and trade. The Fed has already increased interest rates six times in one year as of this date.

International Trade Factors

Under NAFTA, GATT, and other trade agreements, the transfer of production and manufacturing to the emerging nations is also increasing and trade barriers are lowered. Some 160 emerging nations are essentially exempt from environmental pollution controls, under the Kyoto accords. In these nations, electrical power needs and transport needs are increasing, and will continue to increase, due to the increasing production and movement of goods and the building of factories and assembly plants. Very limited pollution controls — if any — will be applied to the new electrical plants and transport capabilities to be built in those exempted nations.

The transfer of manufacturing and production to many of these nations is a transfer to essentially "slave labor" nations where workers have few if any benefits, are paid extremely low wages, work long hours, and have no unions or bargaining rights. The local politicians can usually be "bought" very cheaply so that there are also no effective government controls. This has set up a de facto return to the feudalistic capitalism of an earlier era when enormous profits could be and were extracted from the backs of impoverished workers, and government checks and balances were nil.

The personal view of this author is that NAFTA, GATT, and Kyoto were set in place for this very purpose. As the transfer builds for the next 50 years, it involves the extraction of perhaps \$2 trillion per year, from the backs of these impoverished laborers. It would not appear accidental that Kyoto removed the costly pollution control measures from this giant economic buildup that would otherwise have been required. The end result will be increased pollution of the biosphere on a grand scale.

Ironically, the Environmental Community itself was deceived into supporting the Kyoto accords and helping achieve them, hoping to put controls on biospheric pollution worldwide. In fact the Kyoto accords will have exactly the opposite effect.

Resulting World Economic Collapse

Bluntly, we foresee these factors — and others {[1]} not covered — converging to a catastrophic collapse of the world economy in about eight years. As the collapse of the Western economies nears, one may expect catastrophic stress on the 160 developing nations as the developed nations are forced to dramatically curtail orders.

International Strategic Threat Aspects

History bears out that desperate nations take desperate actions. Prior to the final economic collapse, the stress on nations will have increased the intensity and number of their conflicts, to the point where the arsenals of weapons of mass destruction (WMD) now possessed by some 25 nations, are almost certain to be released. As an example, suppose a starving North Korea {[2]} launches nuclear weapons upon Japan and South Korea, including U.S. forces there, in a spasmodic suicidal response. Or suppose a desperate China — whose long range nuclear missiles can reach the United States — attacks Taiwan. In addition to immediate responses, the mutual treaties involved in such scenarios will quickly draw other nations into the conflict, escalating it significantly.

Strategic nuclear studies have shown for decades that, under such extreme stress conditions, once a few nukes are launched, adversaries and potential adversaries are then compelled to launch on perception of preparations by one's adversary. The real legacy of the MAD concept is this side of the MAD coin that is almost never discussed. Without effective defense, the only chance a nation has to survive at all, is to launch immediate full-bore pre-emptive strikes and try to take out its perceived foes as rapidly and massively as possible.

As the studies showed, rapid escalation to full WMD exchange occurs, with a great percent of the WMD arsenals being unleashed . The resulting great Armageddon will destroy civilization as we know it, and perhaps most of the biosphere, at least for many decades.

My personal estimate is that, beginning about 2007, on our present energy course we will have reached an 80% probability of this "final destruction of civilization itself" scenario occurring at any time, with the probability slowly increasing as time passes. One may argue about the timing, slide the dates a year or two, etc., but the basic premise and general time frame holds. We face not only a world economic crisis, but also a world destruction crisis.

So unless we dramatically and quickly solve the energy crisis — rapidly replacing a substantial part of the "electrical power derived from oil" by "electrical power freely derived from the vacuum" — we are going to incur the final "Great Armageddon" the nations of the world have been fearing for so long. I personally regard this as the greatest strategic threat of all times — to the United States, the Western World, all the rest of the nations of the world, and civilization itself {[3]} {[4]}.

What Is Required to Solve the Problem

To avoid the impending collapse of the world economy and/or the destruction of civilization and the biosphere, we must quickly replace much of the "electrical energy from oil" heart of the crisis at great speed, and simultaneously replace a significant part of the "transportation using oil products" factor also.

The technical basis for that solution and part of the prototype technology required, are now at hand. We discuss that solution in this paper.

To finish the task in time, the Government must be galvanized into a new Manhattan Project {[5]} to rapidly complete the new system hardware developments and deploy the technology worldwide at an immense pace.

Once the technology hardware solutions are ready for mass production, even with a massive worldwide deployment effort some five years are required to deploy the new systems sufficiently to contain the problem of world economic collapse. This means that, by the end of 2003, those hardware technology solutions must have been completed, and the production replacement power systems must be ready to roll off the assembly lines en masse.

The 2003 date appears to be the critical "point of no return" for the survival of civilization as we have known it.

Reaching that point, say, in 2005 will not solve the crisis in time, and the collapse of the world economy as well as the destruction of civilization and the biosphere will still almost certainly occur, even with the solutions in hand.

A review of the present scientific and technical energy efforts to blunt these strategic threat curves, immediately shows that all the efforts (and indeed the conventional scientific thinking) are far too little and far too late. Even with a massive effort on all of the "wish list" of conventional projects and directions, the results would be totally insufficient to prevent the coming holocaust.

As one example, the entire hot fusion effort has a zero probability of contributing anything of significance to the energy solution in the time frame necessary. Neither will windmills, more dams, oil from tar sands, biofuels, solar cells, fuel cells, methane from the ocean bottom, ocean-wave-powered generators, more efficient hydrocarbon combustion, etc. All of those projects are understandable and "nice", but they have absolutely zero probability of solving the problem and preventing the coming world economic collapse and Armageddon.

These conventional approaches are all "in the box" thinking, applied to a completely "out of the box" problem unique in world history.

The conventional energy efforts and thinking are essentially "business as usual but maybe hurry a little bit." They constitute a major part of the problem contributing to the final Armageddon that is hurtling toward us.

If we continue conventionally and with the received scientific view, even with massively increased efforts and a Manhattan Project, we almost certainly guarantee the destruction of civilization as we know it, and much of the biosphere as well.

Bluntly, the only viable option is to develop systems which extract energy directly from the vacuum and are therefore self-powering, like a windmill in the wind {[6]}. Fortunately, analogous open electrical systems far from thermodynamic equilibrium with the active vacuum are permitted by the laws of physics, electrodynamics {[7]} and thermodynamics {[8]}. They are also permitted by Maxwell's equations, prior to the arbitrary curtailment by Lorentz symmetrical regauging. That little mathematical trick by Lorentz made the mathematics much easier to solve (for the "subset" of the Maxwell-Heaviside systems retained).

However, the bad news is that it also just arbitrarily discarded all EM systems far from thermodynamic equilibrium (i.e., asymmetrical) with respect to their vacuum energy exchange.

The good news is that we now know how to easily initiate continuous and powerful "electromagnetic winds" from the vacuum at will. Once initiated, each free EM energy wind flows continuously so long as the simple initiator is not deliberately destroyed.

So we have already solved the first half of the energy crisis problem {[9]} {[10]}: We can produce the necessary "EM energy wind flow" in any amount required, whenever and wherever we wish, for peanuts.

A tiny part of the far frontier of the scientific community is also now pushing hard into catching and using this available EM energy from the vacuum {[11]}. However, they are completely unfunded and working under extremely difficult conditions {[12]}. In addition, there are more than a dozen appropriate processes already available (some are well-known in the hard literature), which can be developed to produce the new types of electrical energy systems {[13]}.

What Must Be Done Technically

We have about two and a half years in which to develop several different types of systems for the several required major applications — particularly the following:

- (1) self-powering open electrical power systems extracting their electrical energy directly from the active vacuum and readily scalable in size and output,
- (2) burner systems {[14]} to replace the present "heater" elements of conventional power plants, increasing the coefficient of performance (COP) {[15]} of those altered systems to $COP > 1.0$, and perhaps to $COP = 4.0$,
- (3) specialized self-powering engines to replace small combustion engines {[16]},
- (4) self-regenerating, battery-powered systems enabling practical electric automobiles, based on the Bedini {[17]} process,
- (5) Kawai $COP > 1.0$ magnetic motors {[18]} with clamped feedback, powering themselves and their loads,

- (6) magnetic Wankel engines {[19]} with small self-powering batteries, which enable a very practical self-powering automotive engine unit for direct replacement in present automobiles,
- (7) permanent magnet motors such as the Johnson {[20]} approach using self-initiated exchange force pulses {[21]} in nonlinear magnetic materials to provide a nonconservative field, hence a self-powering unit,
- (8) iterative retroreflective EM energy flow systems which intercept and utilize significant amounts of the enormous Heaviside dark energy {[22]} which surrounds every electrical circuit but is presently ignored,
- (9) Iterative phase conjugate retroreflective systems which passively recover and reorder the scattered energy dissipated from the load, and reuse the energy again and again {[23]},
- (10) Shoulders' charge cluster devices {[24]} which yield COP>1.0 by actual measurement,
- (11) self-exciting systems using intensely scattering optically active media and iterative asymmetrical self-regauging {[25]}{[26]}{[27]} {56},
- (12) true negative resistors such as the Kron {[28]} and Chung {[29]} negative resistors, the original point-contact transistor {[30]} which can be made into a negative resistor, and the Fogal negative resistor semiconductor, and
- (13) overunity transformers using a negative resistor bypass across the secondary, reducing the back-coupling from secondary to primary and thus lowering the dissipation of energy in the primary {[31]}.

What Must Be Done for Management and Organization

To meet the critical 2003 "point of no return" milestone, the work must be accomplished under a declared National Emergency and a Presidential Decision Directive.

The work must be amply funded, with authority — because of the extreme emergency — to utilize any available patented processes and devices capable of being developed and deployed in time, with accounting and compensation of the inventors and owners separately.

As an example, two of the above mentioned devices — the Kawai engine and the magnetic Wankel engine — can be quickly developed and produced en masse. However, they have been seized by the Japanese Yakuza {[32]} {[33]} {[34]} and are being held off the world market. The two devices are quite practical and can be developed and manufactured with great rapidity. As an example, two models of the Kawai engine were tested by Hitachi to exhibit COP = 1.4 and COP = 1.6 respectively. Use of these two inventions, under U.S. Government auspices, will greatly contribute to solving a significant portion of the transportation power problem, at low risk for this part of the solution. Use of them cannot be obtained by normal civil means, due to the involvement of the Yakuza.

The technical part of the project to solve the energy crisis is doable in the required time — but just barely, and only if we move at utmost speed.

Thanks to more than 20 years work on unconventional solutions to the problem, much of the required solution is already in hand, and the project can go forward at top speed from the outset.

The remaining managing and organizing problem is to marshal the necessary great new Manhattan Project as a U.S. government project operating under highest national priority and ample funding. The Project must be a separate Agency, operating directly under the appropriate Department Secretary and reporting directly to the President (through the Secretary) and to a designated Joint Committee of the Senate and the House.

The selection of the managers and directors must be done with utmost care, else they themselves will become the problem rather than the solution. We strongly stress that here even the most highly qualified managerial scientist may have to be disqualified because of his or her own personal biases and dogmatic beliefs. Leaders and scientists are required who will run with the COP>1.0 ball on a wide front.

The compelling authority to assign individual tasks to the National Laboratories and other government agencies is required, but under no circumstances can the project be placed under the control of the national laboratories themselves. Those laboratories such as Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Oak Ridge National Laboratory are far too committed to their entrenched Big Science projects and the resulting bias against electrical energy from the vacuum.

Assigning management of the project to them would be setting the foxes to minding the hen house, and would guarantee failure. Those agencies whose favored approaches are responsible for the present energy crisis, cannot be expected to direct an effective solution to it that is outside their managerial and scientific ansatz and totally against their institutional and professional biases. If they are allowed to direct the project, then implacable scientists who adamantly oppose electrical energy from the vacuum from the getgo, will hamstring and destroy the project from its inception.

Not only will they fiddle while Rome burns, but they will help burn it.

Enormous EM Energy Flow Is Easily Extracted From the Active Vacuum

At any point and at any time, one can freely and inexpensively extract enormous EM energy flows directly from the active vacuum itself.

There is not now and there never has been a problem in readily obtaining as much electromagnetic energy flow from the vacuum as we wish. Anywhere. Anytime. For peanuts.

Every electrical power system and circuit ever built already does precisely that ^[35]_[36]. But almost all the vast EM energy flow that the present flawed systems extract from the

vacuum is unaccounted and simply wasted. It is wasted by the conventional, seriously flawed circuits and systems designed and built by our power system scientists and engineers in accord with a terribly flawed 136-year old set of electrodynamics concepts and foundations. Specifically, it is wasted because Lorentz discarded it a century ago {36}, and since then everyone has blindly followed Lorentz's lead.

Our electrical scientists and engineers have not yet even discovered how a circuit is powered! They have no valid concept of where the electrical energy flowing down the power line actually comes from. They do not model the interaction that provides it {{37}}, in their theoretical models and equations. This vast scientific "conspiracy of ignorance" is completely inexplicable, because the actual source of the EM energy powering the external circuits has been known (and rigorously proven) in particle physics for nearly half a century! But it has not yet even been added into the fundamental electrical theory used in designing and building power systems.

We have a scientific mindset problem of epic proportions, and scientific negligence and electromagnetics dogma of epic proportions. I sometimes refer to this as an unwitting "conspiracy of ignorance", where I use the word "ignorance" technically as meaning "unaware". We certainly do not intend the phrase to be pejorative.

So we do not have an energy problem per se. We have an unwitting conspiracy of scientific ignorance problem.

Because of its bias, our electrical scientific community also strongly resists updating the 136-year old electrodynamics foundations even though much of it is known to be seriously flawed and even incorrect {{38}} {{39}}. Indeed, organized science has always fiercely resisted strong innovation. As Max Planck {{40}} so eloquently put it,

"An important scientific innovation rarely makes its way by gradually winning over and converting its opponents: it rarely happens that Saul becomes Paul. What does happen is that its opponents gradually die out, and that the growing generation is familiarized with the ideas from the beginning."

Arthur C. Clarke {{41}} expressed it succinctly for our more modern scientific community, as follows:

"If they [quantum fluctuations of vacuum] can be [tapped], the impact upon our civilization will be incalculable. Oil, coal, nuclear, hydropower, would become obsolete — and so would many of our worries about environmental pollution." "Don't sell your oil shares yet — but don't be surprised if the world again witnesses the four stages of response to any new and revolutionary development: 1. It's crazy! 2. It may be possible —so what? 3. I said it was a good idea all along. 4. I thought of it first."

With respect to extracting and using EM energy from the vacuum, our present scientific community is mostly in Clarke's phase 1, with a few scientists in phase 2 who surmise that "it may perhaps be the science of the next century."

We do not have a century remaining. We have two and a half years.

For nearly half a century (i) the active vacuum, (ii) the vacuum's energetic interaction with every dipole, and (iii) the broken symmetry of the dipole in that energetic interaction {44} have been known and proven in particle physics. These proven COP>1.0 vacuum energy mechanisms have not been incorporated into the electrodynamic theory used to design and build electrical power and transportation systems. We are still waiting for the "old scientific opponents" — adamantly opposed to the very notion of electrical energy from the vacuum — to "die off and get out of the way."

Hence our universities, the National Science Foundation, the National Academy of Science, the National Laboratories, etc. have not taken advantage of the enormous EM energy so universally available from the active vacuum, and in fact universally and copiously extracted from the vacuum by every EM system today — and wasted. Indeed, present organized science will not fund and will not tolerate research which would violate the presently decreed view of power systems and their functioning.

So our present organized scientific community will strongly resist funding of a vigorous program to gather all this proven, known physics together and rapidly use it to change and update (modernize) the terribly flawed EM theory and the design of electrical power systems. Most scientists attempting to do this research have had to proceed on their own. They have undergone vicious and continual ad hominem attacks, lost research funds and tenure, been unable to get their papers published, and in fact risked being destroyed by the scientific community itself {12}.

The bottom line is this: Left to sweet reason, because of the depth of its present bias the scientific community is totally incapable of reacting to the problem in time to prevent the destruction of civilization. If we wish to survive, government will have to directly force the scientific community to do the job, over careers and "dead bodies" (so to speak) if necessary.

But first the government itself must be motivated to do so.

That is a task that only the environmental community can do in the extremely short time in which it must be accomplished. So it would seem that the most urgent task of all, is to educate and wake up the environmental community that it has been "had", and it has been "had" since the beginning.

Understanding What Powers Electrical Circuits

Let us cut through the scientific errors in how electrical power systems are presently viewed: Batteries and generators themselves do not power circuits. They never have, and they never will. They dissipate their available internal energy {[42]} to do one thing and one thing only: forcibly separate their own internal charges to form a "source dipole" {[43]}. Once the dipole has been formed, the dipole directly extracts electromagnetic energy from the active vacuum {[44]}, pouring the extracted EM energy out from the terminals of the battery or generator.

Batteries and generators make a dipole, nothing else. All the fuel ever burned, the nuclear fuel rods ever consumed, and chemical energy ever expended by batteries, did nothing but make dipoles. None of all that destructive activity, of itself, ever added a single watt to the power line.

Once made, the dipole then extracts EM energy from the seething vacuum, and pours it out down the circuit and through all surrounding space around the circuit {45}. A little bit of that energy flow strikes the circuit and enters it by being deflected (diverged) into the wires {46}. That tiny bit of intercepted energy flow that is diverged into the circuit, then powers the circuit (its loads and losses) {47}.

All the rest of that huge energy flow around the circuit, just roars on off into deep space and is wasted.

The Dipole Extracts Enormous Energy from the Vacuum

The outflow of EM energy extracted from the vacuum by a small dipole is enormous. It fills all space surrounding the attached external circuit (e.g., surrounding the power lines attached to a power plant generator) {45}. In the attached circuits, the electrical charges on the surfaces of the wires are struck by the mere edge of the violent flow of EM energy passing along those surfaces. The resulting tiny "intercepted" part {46} of the EM energy flow is deflected into the wires, very much like placing one's hand outside a moving automobile and diverting some of the wind into the car. This deflected energy that enters the wires is the Poynting component of the energy flow. It is not the entire EM energy flow by any means, but only a very, very tiny component of it {47}.

Only that tiny bit of the energy flow that is actually diverged into the wires, is used to power the circuit and the loads. All the rest of the enormous energy flow that is present and available outside the circuit, is just ignored and wasted.

A nominal 1-watt generator is actually one whose external circuit can "catch" only 1 watt of its output. The generator's actual total output — in the great flow which fills all space around the external circuit and is not intercepted and used — is something on the order of 10 trillion watts!

Our Scientists and Engineers Design Dipole-Destroying Systems

Here is the most inane thing of all. Precisely half of the small amount of energy that is actually caught by the circuit, is used to destroy the dipole! That half of the intercepted energy does not power the load, nor does it power losses in the external circuit. Instead, it is used to directly scatter the dipole charges and destroy the dipole.

Our scientists and engineers have given us the ubiquitous closed current loop circuit {48}, which destroys the dipole faster than it powers the load. In short, the scientists and engineers design and build only those electrical power systems that "continuously commit suicide" by continuously destroying the source dipole that is extracting the vacuum energy and emitting it out along the circuit to power everything in the first place.

So now we have the real picture.

Every electrical load ever powered, and every load powered today, has been and is powered by electromagnetic energy extracted directly from the seething vacuum by the source dipole in the generator or battery.

But our scientists and engineers design and build electrical power systems that only intercept and use a tiny fraction of the vast EM energy flow available. They also only design and build systems that destroy their source dipole faster than they power their loads.

If one does not destroy the dipole once it is made, it will continue to freely extract copious EM energy flow from the vacuum, indefinitely, pouring out a stupendous flow of EM energy.

As an example, some dipoles in the original matter formed in the Big Bang at the beginning of the universe, have been steadily extracting EM energy from the vacuum and pouring it out for about 15 billion years.

The energy problem is not due to nonavailability of copious EM energy flows at will, as much as one wishes, anywhere, anytime.

The energy problem is in (i) intercepting and utilizing more of the vast energy flows made available by the common dipole, and (ii) doing so without using the present inane designed circuits. These circuits use half their collected energy to destroy the dipole that is extracting the energy flow from the vacuum in the first place!

Ignoring the Vacuum as the Source of Electrical Energy in All Circuits

In their conventional theoretical models, our present electrical power system scientists and engineers do not even include the vacuum interaction or the dipole's extraction of EM energy from the vacuum. They simply ignore — and do not model — what is really powering every electrical system they build.

Consequently, we reiterate that our electrical scientists have never even discovered how an EM circuit is powered — even though it has been discovered and known for nearly 50 years in particle physics.

All the hydrocarbons ever burned, all the water over all the dams ever built, all the nuclear fuel rods ever expended in all the nuclear power plants, added not a single watt to the power line.

Instead, all that expense, effort, and pollution and destruction of the biosphere was and is necessary in order to keep adding internal energy to the generator — so that it can keep continually rebuilding its source dipole that is continually destroyed by the inane circuits that the power system scientists and engineers keep designing and building for us.

It takes as much energy input to the generator to restore the dipole, as it took the circuit to destroy the dipole. Thus all the systems our scientists and engineers design and build, require that we continually input more energy to restore the dipole, than the circuit dissipates in the load.

Our technical folks thus happily design and give us systems which can and will only exhibit $COP < 1.0$. — thus continuing to require that we ourselves steadily provide more energy to the system to continually rebuild its dipole, than the inane masochistic system uses to power its load.

In short, we pay the power companies (and their scientists and engineers) to deliberately engage in a giant wrestling match inside their generators and lose.

Needless to say, that is not the way to run the railroad! One is reminded of one of the classic comments by Churchill:

“Most men occasionally stumble over the truth, but most pick themselves up and continue on as if nothing had happened.”

Unfortunately, at present it seems that not very many energy system scientists and engineers have "stumbled over the truth" as to what really powers their systems, and how inanely they are really designing them.

Electrical Energy Required from Hydrocarbon Burning Drives the Problem

The heart of the present environmental pollution problem is the ever-increasing need for electrical energy obtained from burning of hydrocarbon fuels and/or nuclear power stations.

The increasing production of electrical power to fill the rising needs, increasingly pollutes the environment including the populace itself (lungs, bodies, etc.). Almost every species on earth is affected, and every year some species become extinct as a result.

Environmental pollution includes pollution of the soil, fresh and salt water, and the atmosphere by a variety of waste products. Given global warming, it also includes excess heat pollution in addition to chemical and nuclear residues.

Under present procedures, the electrical energy problem is exacerbated by decreasing available oil supplies, which are believed to have peaked this year, with a projected decline from now on.

But really, the electrical energy problem is due to the scientific community's adamant defense and use of electrical power system models and theories that are 136 years old {[49]} in their very foundations, riddled with errors and non sequiturs, and seriously flawed.

The scientific community has not even recognized the problem, much less the solution. In fact, it does not even intend to recognize the problem, even though the basis for it has been known in particle physics for nearly 50 years. As Bunge {[50]} put it some decades ago:

"...it is not usually acknowledged that electrodynamics, both classical and quantal, are in a sad state."

The scientific community has done little to correct that fundamental problem since Bunge made his wry statement.

Let us put it very simply: The most modern theory today is modern gauge field theory. In that theory, freedom of gauge is assumed from the getgo. Applied to electrodynamics, this means — as all electrodynamicists have assumed for the last century or longer — that the potential energy of an EM system can be freely changed at will. In other words, in theory it costs nothing at all to increase the EM energy collected in a system; this is merely "changing the voltage", which does not require power. In other words, we can "excite" the system with excess energy (actually taken from the vacuum), at will. For free. And the best science of the day agrees with that statement.

It also follows that we can freely change the excitation energy again, at will. In short, we can dissipate that excess energy freely and at will. Without cost.

Well, this means that we are free — by the laws of nature, physics, thermodynamics, and gauge field theory — to dissipate that free excess potential energy in an external load, thus doing "free work".

Since none of the systems our energy scientists and engineers build for us are doing that, it follows a priori that the fault lies entirely in their own system design and building. It does not lie in any prohibition by nature or the laws of physics.

A priori, then, the present $COP < 1.0$ performance of our electrical power systems is a monstrosity and the direct fault of our scientists and engineers. We cannot blame the laws of nature or the laws of physics.

The present energy crisis then is due totally to that "conspiracy of ignorance" we referred to, that is maintained by the scientific community, and that has been maintained by it for more than 100 years.

This is the real situation that the environmentalists must become aware of, if they are to see the correct path into which their energies and efforts should be directed — to solve both the energy crisis and the problem of gigantic pollution of the biosphere.

Outside Intervention Must Forcibly Move Energy Science Forward

Unless outside intervention occurs forcibly, the scientific community's lock-up of research funds for "in the box" energy research may result in the economic collapse of the Western World in perhaps as little as eight years.

Let us examine the gist of the problem facing us.

Suppose we launch a crash program to develop, manufacture, deploy, and employ the new "vacuum powered" systems. Once the new self-powering systems are developed and ready to roll off the production lines en masse, it will require a minimum of five years worldwide to sufficiently alter the "electrical energy from oil" demand curve, so that economic collapse can be averted. In turn, this means that the new systems must be ready to roll off the

manufacturing lines by the end of 2003. While this is a very tight schedule, it can be done if we move rapidly.

The necessary scientific corrections along the lines indicated in this paper can be quickly applied to solve the electrical energy problem permanently and economically, given a Manhattan type project under a Presidential Decision Directive together with a Presidential declaration of a National Energy Emergency.

In a paper {[51]} to be published in Russia in July 2000, this researcher has proposed some 15 viable methods for developing new "self-powering" systems powering themselves and their loads with energy extracted from the vacuum. Several of these systems can be developed very rapidly and easily mass produced.

A second paper {[52]} will be published in the same proceedings, revealing the Bedini method for invoking a negative resistor inside a storage battery. The negative resistor freely extracts vacuum energy and adds it to both the battery-recharging function and the load powering function.

In Bedini's negative resistor method, decoupling (dephasing) the ion current inside the battery from the electron current between the outer circuit and the external surfaces of the battery plates, allows the battery to be charged (with increased charging energy) simultaneously as the load is powered with increased current and voltage.

At my specific request, both papers were thoroughly reviewed by qualified Russian scientists, and the premises passed with flying colors.

A third paper {[53]} gives the exact giant negentropy mechanism by which the dipole extracts such enormous energy from the vacuum. We will further explain that mechanism below.

Conventional Approaches: Too Little, Too Late

It appears that the Environmental Community itself has finally realized that the present scientific approaches and research are simply too little and too late. Further, the conventional approaches are largely "in the box thinking" applied to an "out of the box problem." We leave it to others such as Loder {[54]} to succinctly summarize the shortfalls of these present solutions. Loder, e.g., particularly and incisively explains how the problem with automobiles breaks down.

In fact, no one single $COP > 1.0$ approach will be all-sufficing. Several solutions, each for a different application, must be developed and deployed simultaneously.

As an example, it is possible to create certain dipolar phenomena in plasmas produced in special burners, such that the dipoles extract substantial excess EM energy from the vacuum and output it as ordinary excess heat well beyond what the combustion process alone will yield. Given a Manhattan type project, the inventor of that process (with already working models and rigorous measurements) could rapidly be augmented to develop a series of replacement burners (heaters) for ordinary electrical power plants to use in heating the water to make the steam for the steam turbines turning the shafts of the generators. The entire

remainder of the power system, grid, etc. could be left intact. Some fuel would still be burned, but far less would be consumed in order to furnish the same required heat output.

In short, a rather dramatic reduction in power plant hydrocarbon combustion could be achieved — in the present electrical power plants with minimum modification, and in the necessary time frame — while maintaining or even increasing the electrical energy output of the power systems. We believe the inventor would fully participate in a government-backed Manhattan type energy program where a National Emergency has been declared, given a U.S. government guarantee that his process, equipment, and inventions will not be confiscated. {[55]}

Another process capable of quick development and enormous application is the development of point contact transistors as true negative resistors {30}.

Two other processes that can be developed for massive production in less than two years are (i) the Kawai process {18}, and (ii) the magnetic Wankel process {19}. In addition, the Johnson {20} process can be developed and readied for manufacture in the same time frame, given a full-bore sophisticated laboratory team.

There are other processes {[56]} {51} {52} which can also be developed rapidly, to provide major contributions in solving their parts of the present "electrical energy from hydrocarbon combustion" problem.

Giant Negentropy and a Great New Symmetry Principle

We now summarize some recent technical discoveries by the present author that bear directly upon the problem of extracting and using copious EM energy flows from the vacuum.

Any dipole has a scalar potential between its ends, as is well-known. Extending earlier work by Stoney {[57]}, in 1903 Whittaker {[58]} showed that the scalar potential decomposes into — and identically is — a harmonic set of bidirectional longitudinal EM wavepairs. Each wavepair is comprised of a longitudinal EM wave (LEMW) and its phase conjugate LEMW replica. Hence the formation of the dipole actually initiates the ongoing production of a harmonic set of such biwaves in 4-space {[59]}.

We separate the Whittaker waves into two sets: (i) the convergent phase conjugate set, in the imaginary plane, and (ii) the divergent real wave set, in 3-space. In 4-space, the 4th dimension may be taken as $-ict$. The only variable in $-ict$ is t . Hence the phase conjugate waveset in the scalar potential's decomposition is a set of harmonic EM waves converging upon the dipole in the time dimension, as a time-reversed EM energy flow structure inside the structure of time {[60]}. Or, one can just think of the waveset as converging upon the dipole in the imaginary plane {[61]} — a concept similar to the notion of "reactive power" in electrical engineering.

The divergent real EM waveset in the scalar potential's decomposition is then a harmonic set of EM waves radiating out from the dipole in all directions at the speed of light. As can be

seen, there is perfect 4-symmetry in the resulting EM energy flow, but there is broken 3-symmetry since there is no observable 3-flow EM energy input to the dipole.

Our professors have taught us that output energy flow in 3-space from a source or transducer, must be accompanied by an input energy flow in 3-space. That is not true. It must be accompanied by an input energy flow, period. That input can be an energy flow in the 4th dimension, time — or we can consider it as an inflow in the imaginary plane. The flow of energy must be conserved, not the dimensions in which the flow exists. There is no requirement by nature that the inflow of energy be in the same dimension as the outflow of EM energy.

Indeed, nature prefers to do it the other way! Once one unties nature's foot from the usually enforced extra condition of 3-space energy flow conservation, nature joyfully and immediately sets up a giant 4-flow conservation, ongoing, where enormous EM energy is inflowing from the imaginary plane into the source charge or dipole, and is flowing out of the source charge or dipole in 3-space, at the speed of light, and in all directions.

In other words, nature then gladly gives us as much EM energy flow as we need, indefinitely — just for paying a tiny little bit initially to "make the little dipole." After that, we never have to pay anything again, and nature will happily keep on pouring out that 3-flow of EM energy for us. This is the giant negentropy mechanism I uncovered, performed in the simplest way imaginable: just make an ordinary little dipole.

We may interpret the giant negentropy mechanism in electrical engineering terms [\[62\]](#). The EM energy flow in the imaginary plane is just incoming "pure reactive power" in the language of electrical engineering. The outgoing EM energy flow in the real plane (3-space) is "real power" in the same language. So the dipole is continuously receiving a steady stream of reactive power, transducing it into real power, and outputting it as a continuous outflow of real EM power.

Further, there is perfect 1:1 correlation between the convergent waveset in the imaginary plane and the divergent waveset in 3-space. This perfect correlation between the two sets of waves and their dynamics represents a deterministic re-ordering of a fraction of the 4-vacuum energy — a re-ordering initiated by the formation of the dipole, and spreading radially outward at the speed of light.

This clearly shows that (i) we can initiate reordering of a usable fraction of the vacuum's energy at any place, anytime, easily and cheaply (we need only to form a simple dipole), and (ii) the process continues indefinitely, so long as the dipole exists, without the operator inputting a single additional watt of power.

And the greatest benefit of all is that, so long as the dipole exists and this re-ordering continues, a copious flow of observable, usable EM energy pours from the dipole in all directions at the speed of light.

This is the full solution to the first half of the energy crisis, totally solved once and for all.

Ansatz of the Major Players

Scientific Community

For the most part, the organized scientific community varies from highly resistant to openly hostile toward any mention of extracting copious EM energy from the active vacuum. The "Big Nuclear" part of the community is particularly adamant in this respect, as witness its ferocious onslaught on the fledgling and struggling cold fusion researchers — a ferocity of scientific attack seldom seen in the annals of science {[63]} {[64]}.

The scientific community also largely suppresses {[65]} or severely badgers scientists attempting to advance electrodynamics to a more modern model, suitable to the needs of the 21st century and the desperate need for cheap, clean, nonpolluting electrical power worldwide {12}. The community still applies classical equilibrium thermodynamics to the electrical part of all its electrical power systems, even though every EM system is inherently a system far from equilibrium with the active vacuum environment, and a different thermodynamics applies. Only if the system is specifically so designed — e.g., so that during the dissipation of its excitation energy it enforces the Lorentz symmetrical regauging condition — will the system behave as a classical equilibrium system.

The thermodynamics of open dissipative systems is well-known {[66]}. Such systems are permitted to (1) self-order, (2) self-oscillate or self-rotate, (3) output more energy than the operator inputs (the excess energy is freely received from the active environment), (4) power itself and its load simultaneously (all the energy is taken from the active environment, similar to a windmill's operation), and (5) exhibit negentropy.

That our present electrical power systems do not do these five things, even though every one of them is an open system in violent energy exchange with the vacuum, a priori reveals that it is the scientific model and the engineering design that are at fault.

It is not any law of nature or principle of physics that prevents self-powering open electrical power systems. Instead, it is the scientific community and its prevailing mindset against extracting and using EM energy from the vacuum.

Environmental Community

In the past the environmental community has been overly naïve with respect to physics, and particularly with respect to electrical physics. Its science advisors have come mostly from the conservative "in the box" scientific community. Hence the community has failed to realize that $COP > 1.0$ electrical power systems are normal and permitted by the laws of nature and the laws of physics. They have no inkling that Heaviside discovered — in the 1880s! — the enormous unaccounted EM energy pouring from the terminals of any battery or generator. They are unaware that Poynting considered only the tiny component of the energy flow that enters the circuit. They are also unaware that, completely unable to explain the astounding enormity of the EM energy flow if the nondiverged (nonintercepted) Heaviside component is accounted, Lorentz {9} just arbitrarily used a little procedure to discard that troublesome Heaviside "dark" (unaccounted) component.

Lorentz reasoned that, since the huge dark energy flow component missed the circuit entirely, it "had no physical significance." This is like arguing that none of the wind on the ocean has

any physical significance, except for that small portion of the wind that strikes the sail of one's own sailboat. It ignores the obvious fact that whole fleets of additional sailboats can also be powered by that "physically insignificant" wind component that misses one's own sailboat entirely.

Nonetheless, electrodynamicists continue to use Lorentz's little discard trick, and try to call the feeble Poynting energy flow component caught by the circuit the entire EM energy flow connected with it. This is like arguing that the component of wind hitting the sails of one's own sailboat, is the entire great wind on the ocean.

As a result, the environmental community has failed to grasp the real reason for the energy crisis and the increasing pollution of the biosphere. They have been deceived and manipulated into thinking that conventional organized science is giving them the very best technical advice possible on electrical power systems. The environmentalists have been and are further deceived into believing that the conventional scientific community is advocating and performing the best possible scientific studies and developments for trying to solve the energy crisis.

Of major importance, the environmental community itself has been deceived as to the exact nature of the energy flow in and around a circuit, the vastness of the unaccounted energy flow (or even that any of the energy flow is deliberately unaccounted), and the fact that this present but unaccounted EM energy flow can be intercepted and captured for use in powering loads and developing self-powering systems.

Worst of all, the environmental community has been deceived as to what powers every electrical load and EM circuit, and that burning all those hydrocarbons, using those nuclear fuel rods, building those dams and windmills, and putting out solar cell arrays are necessary and the best that can be done. In short, they have been smoothly diverted from solving the very problem — the problem of the increasing pollution and destruction of the biosphere — they are striving to rectify.

However, judging from their continued demonstrations in the street, at least many environmentalists now suspect that much of the world's continued policy of "the rich get richer and the poor get poorer" in international trade agreements are deliberately planned and implemented to the advantage of a favored financial class and the exploitation of the poorer laboring classes in disadvantaged nations.

Electrical Power Community

The electrical power community:

- (1) ubiquitously uses equilibrium thermodynamics, believing that $COP > 1.0$ is perpetual motion nonsense and against the laws of physics,
- (2) has no notion that the energy flowing down their power lines and filling all space around them, is extracted directly from the active vacuum by the source dipole in the generator,
- (3) erroneously believes that the hydrocarbons they burn, or the water through the hydroturbines at the dam, or the nuclear fuel rods they consume, actually add the power to the transmission lines,

(4) uses half of the tiny component of energy caught by the power lines, to destroy the source dipoles in their generators, thus requiring ever more shaft input energy via powering a steam turbine, hydroturbine, etc.,

(5) believes that energy can be "used" only once, when in fact it can be used and re-used repeatedly since it cannot be created or destroyed,

(6) allows only a single pass of the EM energy flow down the power lines, so that only one tiny interception of energy occurs from the energy flow and the rest (most) of the energy flow is wasted,

(7) believes that the electrical energy problem translates into more hydrocarbon combustion or nuclear fuel rod consumption rather than a totally different way of doing business, and

(8) believes that the theory they apply is correct, when in fact it is so seriously flawed as to be inane, and has been inane for a century.

Industries also acquire their own hidden agendas, when serious threats to the industry arises. As an example, a potentially serious problem arose some decades ago when it became apparent that EM radiation from power lines might detrimentally affect people or at least some people. To put it gently, a great deal of fuss and fury resulted, and a great deal of money was and is spent by the power companies (or through organizations and foundations funded by them) in EM bioeffects research. Not too surprisingly, just about the entire output of this industry-funded research "finds" that there is no problem with powerline radiation {[67]}. Those scientists such as Robert Becker {[68]} {[69]} who advocate or show otherwise, usually wind up having all their funds cut off, hounded from their jobs, and — in the case of Becker — forced to retire early.

It is no different in the electrical energy science field {12}.

Storage Battery Companies

Battery companies are primarily of much the same outlook and ansatz as are the power companies. They have gone to pulse charging of batteries and improved battery chemistry and materials {[70]}. They have no notion that batteries do not power circuits, but only make source dipoles — and it is the source dipole that then extracts EM energy from the vacuum and pours it out into the external circuit.

Consequently they erroneously believe that chemical energy in the battery is expended in order to provide power to the external circuit. Instead, it is expended only to continuously remake the source dipole, which the closed current loop circuit fiendishly keeps destroying faster than the load is powered.

They also have not investigated deliberately dephasing and decoupling the major ion current within the battery and between the plates, from the electron current between the outside of the plates and the external circuit. Consequently they have no concept of permissible Maxwellian COP>1.0 battery-powered systems. Instead, battery companies, scientists, and engineers still believe — along with the power companies and most electrodynamicists, and

the environmental community — that applying the Lorentz symmetrical regauging to the Heaviside-Maxwell equations retains all the Maxwellian systems. It does not. Instead, it arbitrarily discards all Maxwellian systems which are permitted by the laws of nature and the laws of physics to produce $COP > 1.0$!

University Community

The University community mostly supports the prevailing EM view and also suffers from the rise of common "greed" in the universities themselves. The professor now must attract external funding (for his research, and for his graduate students —and especially for the lucrative "overhead" part of the funding which goes to the University itself). The research funds available for "bidding" via submitting proposals, are already cut into "packages" where the type of research to be accomplished in each package is rigorously specified and controlled. Research on $COP > 1.0$ systems is strictly excluded. Dramatic revision of electrodynamics is excluded.

Unless the professor successfully bids and obtains packages and their accompanying funding, he is essentially ostracized and soon discharged or just "parked" by the wayside. Also, if he tries to "go out of the box" in his papers submitted for publication, his peer reviewers will annihilate him and his papers will not be published. Shortly he will effectively be blacklisted and it will be very difficult for him to have his submitted papers honestly reviewed, much less published. Again, that means no tenure, no security, and eventual release or "dead-end parking" by the university.

When one looks at the "innovative" packages so highly touted, they either (1) are research focused upon some approved thing such as hot fusion — which has spent billions and has yet to produce a single watt on the power line, and cannot do so in any reasonable time before the collapse of the Western economy — or (2) use clever buzzwords for things which are actually "more of the same" and "in the box thinking" with just some new words or twists thrown in for spin control.

Meanwhile, all this makes for a self-policing system which rewards conservatism — conservative publications, conservative research, conservative thinking, conservative teaching, etc. In short, it selects and approves electrical power system research that is "too little, too late" to solve the world energy crisis in time, and ruthlessly rejects all the rest. It also makes for a self-policing system which roots out and destroys (or parks on the sidelines) those professors, graduate students, and post-docs who — given a chance to be highly innovative and "out of the box" researchers — might upset the status quo.

In short, the scientific community is itself the greatest arch foe of high innovation, and the university generally typifies and reflects that overall attitude because of the control and management of its outside research funds by the upper echelons of the organized Big Science community, government, etc.

Government Community — Technical

The technical part of the U.S. government research community is drawn from the universities, private industry, etc. and mostly reflects an even more conservative group than the universities. Again, papers published and funding are the major requirements, within given and largely accepted scientific constraints. Further, the managerial government scientists

must compete for funding, annual budgets, etc. and have their own "channel" constraints from on high. At the top levels (such as NSF and NAC), cross fertilization by the aims and perceptions of the conservative scientific community leaders is achieved.

Hence the government technical community is largely constrained in two fashions: (1) by its own forced competition for funds, facilities, positions, programs, etc., and (2) by its strong cross-fertilization from the top scientific personnel in NSF, NAC, etc. Individual scientists also face the need to publish or perish, and so are further constrained by the reviewers etc. of the journals.

Most managers within the government scientific community are striving to scamper up the managerial ladder, much as managers elsewhere. One's power and prestige rises as one's position level rises — and particularly as the part of the government's research budget rises that one controls. There is a fine tight rope to walk whereby, as one gains control of more government budget for research, one becomes a powerful influence on the large research corporations which will submit very complex and extensive proposals for the funds.

A sort of "common understanding" thus arises between industry leaders, higher government research leaders and managers, etc. This can be so profound that the practical result is almost a sort of "collusion by common understanding" between the government and industrial complexes and a fusion into one consortium — essentially the "military-industrial complex" which President Eisenhower warned Americans against.

The end result is that the government managers in their Request for Quotations (RFQs) use words such as "out of the box" and "highly innovative", but rarely will fund such proposals because they simply cannot obtain approval for such budgets and programs from "higher up the chain". As witnessed by the ultrawideband (UWB) radar controversy, the government technical community is even more resistant to innovation and change than is the civilian technical community.

As an example, the early UWB radar pioneers (Harmuth, Barrett, etc.) in ultrawideband radar were attacked by entrenched government scientists and government scientific organizations with a viciousness rarely seen in the annals of government science. The objection raised was that sinusoidal EM waves could not do such things — even though the UWB radar used nonsinusoidal EM waves, and small UWB radar sets were commercially available and used to detect voids in concrete structures, the ground, etc. The real reason for the violent attacks was the prestige and power of the Stealth community at the time — and because UWB radar had the implication of tracking Stealth vehicles readily.

Interestingly, the arch foes of UWB at the time, today would have us believe they are "staunch experts" in the UWB field. To understand their remarkable metamorphosis, one need only recall Arthur C. Clarke's words, quoted earlier.

In the $COP > 1.0$ EM energy field, we are still rather much at the stage where the UWB researchers started. We are still in the "violent attack, personal insults, character assassination, slander, libel, etc." stage. Sadly, such ad hominem savagery is by scientists who themselves have no notion of how electromagnetic circuits are actually powered, but like ostriches still have their heads buried in the sand back there in the 1880s when Lorentz discarded the enormous Heaviside energy flow component.

Government Community — Non Technical

Here we have a rather mixed situation. The nontechnical person — e.g., a Senator or a Congressperson — is operating under a distinct disadvantage. If he or she takes the stance that much better electrical power systems can readily be achieved, he or she is in fact opposing almost the entire set of University, Government Technical, Power Company, Battery Company, and Organized Science communities. Further, in most cases his technical advisors are themselves from one or the other of those communities, and likely to go back into that community or those communities when the Senator or Congressperson leaves office, or even before. So the Congress and the non-technical government community at large operate at a great disadvantage.

As an example, admittedly there are some very misguided unorthodox energy system inventors and scientists out there, who in the guise of furthering COP>1.0 systems, actually contribute to the problem rather than to the solution. A few do not even realize that they cannot properly measure a "spiky" output with an RMS meter! Some are also more interested in selling "dealerships" and "stock" than in furthering the science of COP>1.0 systems. Few have submitted their purported COP>1 devices to rigorous testing by an independent, Government-certified test laboratory {[71]}.

This "noise" seriously dilutes the unconventional scientific community's legitimate efforts in COP>1.0 systems. By highly playing up such "dilution" and accenting "the crazies", the orthodox scientific community often convinces government nontechnical managers and personnel that the entire unorthodox scientific COP>1.0 community is comprised only of lunatics, charlatans, stock-scam artists and misguided crank inventors.

Such of course is not the case. A goodly number of reputable, skilled scientists are seriously struggling with the problems of developing COP>1.0 EM power systems and devices. A few are also struggling to develop an adequate theory of such systems. Progress is slowly being made and has been made, in spite of continuing harassment.

The independent assessments that Congress once enjoyed with the OTA are no more because the OTA was abolished. Now the committees, subcommittees, and individual Congresspersons and Senators are largely on their own, with their own staffs and their own technical advisors.

That said, nonetheless it can be seen by savvy Senators and Congresspersons that the U.S. Ship of State is headed for a great economic bust, and probably the greatest one of all time.

The Government Non-Technical community (the Senate and the Congress, in particular) are in far better shape than the Government Technical community, to appreciate the world implications of the pending economic disaster. I am hopeful that both the environmentalists and the Government Non-Technical community will rapidly unite in a common goal to get this vacuum energy program launched, under a National Emergency declaration. If so, then they can solve the energy crisis and the pending economic crisis, in fairly short order, and permanently.

In Conclusion

There is an even more ominous specter looming behind the shadow of the coming great economic collapse. When national economies get strained to the breaking point — with some of them failing, etc. worldwide as the price of oil escalates — the conflicts among nations will increase in number and grow in intensity. About a year or so ahead of the "Great Collapse" of the world economies, the intensity and desperation of the resulting national conflicts will have increased to the breaking point.

Some 25 nations already have weapons of mass destruction (WMD) — including nuclear warheads; missile, aircraft, boat, and terrorist delivery systems; biological warfare weaponry; other advanced weapons {3} {4}, etc.

Any knowledgeable person knows that hostile terrorist agents are already on site here in the U.S. {[72]}, and some will have smuggled in their WMDs. It is not too difficult to surmise that some of those missing Russian "suitcase nukes" probably wound up right here in the U.S., hidden in our population centers. Or that some of Saddam Hussein's large stock of anthrax has been spirited into the U.S. as well. As is well-known, the threat from weapons of mass destruction is now officially recognized as the greatest strategic threat facing the U.S. It is not a matter of if the WMD weapons will be unleashed, but when.

If one transposes that recognized escalating WMD threat onto the escalating economic pressures worldwide, then another factor comes into play — the dark side of the Mutual Assured Destruction (MAD) concept. We have opted (at least to date) not to defend our populace, but deliberately have placed U.S. population centers in a situation where their destruction is "assured" once the WMD balloon really goes up.

The insanity of the MAD concept is revealed when war preparations by many nations start to be perceived — as they will be, when the conflicts intensify sufficiently and the looming economic collapse tightens the cinch on the nations of the world.

Without any protection of its populace, a defending nation has to fire on perception of nuclear preparations by its adversaries, if that nation is to have even the slightest chance of surviving.

In short, at about that 2007 date when a nation sees its adversaries preparing WMD and nuclear assets for launch or use in ongoing intense conflicts, at some point that nation must pre-empt and fire massively, or accept its own "assured destruction".

The only question in MAD is whether or not the assured destruction shall be mutual or solitary.

So one or more nations will fire, immediately moving all the rest into the "fire on perception" mode. Very rapidly the situation then escalates to the all-out world-wide exchange so long dreaded. This massive exchange means the destruction of civilization itself, and probably much of the entire biosphere for decades or centuries. Such escalation from one or more initial nuclear firings has been shown for decades by all the old strategic nuclear studies. It is common knowledge to strategic analysts unless one engages in wishful thinking.

Eerily, this very threat now looms in our not too distant future, due in large part to the increasing and unbearable stresses that escalating oil prices will elicit.

So about seven years or so from now, we will enter the period of the threat of the Final Armageddon, unless we do something very, very quickly now, to totally and permanently solve the present "electrical energy from oil" crisis.

This is really why we must have a National Emergency proclamation, and a Manhattan Project, since mass manufacturing, deployment, and employment of replacement electrical power systems must begin in early 2004.

In my estimate, the point of no return for developing the self-powering replacement systems is about the end of 2003. If by early 2004 we do not have multiple types of vacuum-energy powered systems rolling off the assembly lines en masse, then we shall overshoot the point of no return and it matters not whether the systems then become available or not. They will then be too late to prevent the great Armageddon and the destruction of civilization itself.

Personally, the present author regards the increasing energy crisis as the greatest strategic threat to the United States in its entire history. I will do anything within my power to help prevent what I perceive to be the looming economic collapse of the Western world, preceded or accompanied by a sudden, explosive, all-out and continuing exchange of the WMD arsenals of most of the world.

We can still meet this early 2004 production deadline. It is difficult, but it is definitely a doable at this time.

We must do it, and we must do it now. Else the technology for electrical energy from the vacuum will also be "too little, too late." In that case, not only the world economy but civilization itself will likely be destroyed — not 100 years from now, not 50 years from now, but in less than one decade from now.

In the name of all humanity, let us begin! Else by the time this first decade of the new millennium ends, much of humanity may not remain to see the second decade.

References and Notes

[1]. As an example of another important but little-known factor, the Japanese Yakuza have penetrated most large Japanese corporations, including Japanese banking and to include the national Japanese bank. E.g., see Michael Hirsh and Hideko Takayama, "Big Bang or Bust?" *Newsweek*, Sept. 1, 1997, p. 44-45. Some \$300 billion or more were extracted by the Yakuza from the Japanese taxpayers in a great land scandal. Japan's banks loaned billions to Yakuza-affiliated real-estate speculators, and the Yakuza would not repay the funds. As a result, the banks were literally terrified to collect on the \$300-600 billion in bad debt that ensnared the banking system. E.g., when Sumitomo Bank got a little aggressive in collecting loans in Nagoya, its branch manager was killed. For a summary of this scandal, see Brian Bremner, "How the Mob burned the Banks: The Yakuza is at the center of the \$350 billion bad-loan scandal," *Business Week*, Jan. 29, 1996, p. 42-43, 46-47. The Japanese government — i.e., the taxpayers — had to absorb this enormous loss.

The Yakuza have achieved the power and status of a hostile nation, operating within U.S.-Japanese corporate relations and other nations' relations with Japan, and also within the oriental communities of foreign states. Great influence upon the ability or inability of the U.S. government to continue its deficit financing now rests in the hands of the Yakuza. Effectively, the Yakuza can trigger a U.S. stock market crash at will, by simply shutting off all further Japanese purchase of U.S. government deficit financing bonds.

The Yakuza regard themselves as the last Samurai, still follow the old Bushido concept, and are intensely hostile to the United States for the humiliating defeat of Japan in WW II and for dropping the atomic bomb on Japan. At the critical time in the coming economic crisis, cessation of Japanese purchase of U.S. Government bonds can and will initiate the financial coup de grace which generates the final and sudden collapse of the U.S. economy, dragging down other economies with it. It appears that the Yakuza tested the response of the U.S. stock market to this tactic on two occasions, by simply slowing the rate of Japanese purchases of U.S. government bonds. The immediate drops in the stock market on both occasions showed the efficacy of this financial weapon, whenever the Yakuza wish to employ it.

In the U.S., the Yakuza constitute an important and growing hostile terrorist group, an intense subculture increasing in numbers, and a group biding its time prior to engaging in mass terrorism strikes. In 1990 the Yakuza together with the Aum Shinrikyo leased the operational use of clandestine strategic longitudinal EM wave interferometer weapons in Russia, and now possess some of the most powerful strategic weapons on earth (see notes 3 and 4, below).

[2]. The recent historic meetings of North and South Korean leaders, with proclamations of cooperation etc., are a healthy sign for the better. With the former implacable North Korean dictator now dead, the new and younger leader may have less hostile outlook. However, progress can be made only very slowly, since the Communist apparatus is still in power in the armed forces and the nation. Only as more of the old die-hard Communist leaders die off, will real progress start to be made in materially lessening the threat posed by North Korea. That is a process requiring a generation, but at least a start has been made. For our thesis, that progress is likely to be sufficiently slow that, while it damps the stress curves a little, it has no appreciable effect on the overall thesis of the eruption within the decade of a great conflagration involving weapons of mass destruction.

[3]. Also involved, there are clandestine weapons of far greater power than nuclear weapons, but most of that subject is beyond the scope of this presentation. For some time we have informed the U.S. government of these developments, the evidence, the events, etc. An example — current at its time of preparation — is T. E. Bearden, *Energetics: Extensions to Physics and Advanced Technology for Medical and Military Applications*, CTEC Proprietary, May 1, 1998, 200+ page inclosure to CTEC Letter, "Saving the Lives of mass BW Casualties from Terrorist BW Strikes on U.S. Population Centers," to Major General Thomas H. Neary, Director of Nuclear and Counterproliferation, Office of the Deputy Chief of Staff, Air and Space Operations, HQ USAF, May. 4, 1998. Copies of a similar presentation were furnished the DoD, Senator Shelby as head of the Senate's Intelligence subcommittee, and Congressman Weldon as head of the House's Intelligence subcommittee efforts, as well as other U.S. government agencies.

[4]. The earlier clandestine asymmetrical strategic weapons developed by the former USSR under rigid KGB control, were longitudinal EM wave interferometers, which are the weapons obliquely referred to by Defense Secretary Cohen in this statement: ""Others [terrorists] are engaging even in an eco-type of terrorism whereby they can alter the climate, set off earthquakes, volcanoes remotely through the use of electromagnetic waves... So there are plenty of ingenious minds out there that are at work finding ways in which they can wreak terror upon other nations...It's real, and that's the reason why we have to intensify our [counterterrorism] efforts." Secretary of Defense William Cohen at an April 1997 counterterrorism conference sponsored by former Senator Sam Nunn. Quoted from DoD News Briefing, Secretary of Defense William S. Cohen, Q&A at the Conference on Terrorism, Weapons of Mass Destruction, and U.S. Strategy, University of Georgia, Athens, Apr. 28, 1997. The present author has been briefing these weapons to DoD and other government agencies for many years. Most major weapons laboratories in various nations have now discovered longitudinal EM waves and either have such weapons or are furiously developing them. At least seven nations now possess them.

[5]. Proceeding conventionally as at present, it will be 50 years before the organized scientific community will permit these emerging solutions to actually be developed and produced. This is senseless; as the Manhattan Project in WW II showed, a newly emerging technology can go to production in four years. Given only that neutron fission of the proper uranium isotope produced more neutrons than were input, the Manhattan Project developed fully operational atomic bombs of two major types in four years. An appreciable number of other "waiting areas for such development" exist in science in the literature, but are not usually pushed forward into development for decades due to the continuing resistance of the scientific community to all innovations which threaten the favored projects (such as hot fusion) and favored theories. Any "scientist in the trenches" is well-aware that the progress of science is by means of a continuing massive cat and dog fight, not at all by sweet scientific reason and logic.

[6]. We strongly point out that Maxwell's equations are purely hydrodynamic equations. There is thus a 100% correspondence to hydrodynamics and electromagnetic power systems. Anything that can be done mechanically, or hydrodynamically with fluid flow, can be done with electromagnetic field energy flow, a priori. It is thus a serious fault of the scientific community in proclaiming that electrical power systems with $COP > 1.0$ are prohibited, because closed systems cannot exhibit $COP > 1.0$. All such arguments are evanescent, since all they state is that an open EM system far from thermodynamic equilibrium with the active vacuum is what is required. But the classical electrodynamics (136 years old) used to design and build electrical power systems, does not even model the energy exchange between active vacuum and the system. To put it mildly, this is a completely inexplicable aberration of the scientific mindset, and it has been such for over a century.

[7]. Open EM systems far from thermodynamic equilibrium with their electrically active vacuum environment are indeed permitted by the Maxwell-Heaviside equations, prior to the arbitrary symmetrical regauging of the equations to yield simpler equations more mathematically amenable (done by Lorenz in 1867 and later by H.A. Lorentz). The Lorentz condition requires that the system be symmetrical in its discharge of its free excitation energy. The present closed current loop circuit ubiquitously used in power systems is designed specifically such that the system itself enforces the Lorentz symmetrical discharge of its excitation energy. Thus one-half of the energy is discharged in the external losses and load, while one-half is discharged to destroy the source dipole actually extracting the EM energy

from the active vacuum. Such design guarantees a system which destroys its intake of free electrical energy from the vacuum faster than it can use part of that energy to power the load. I.e., it guarantees suicidal systems which can only exhibit $COP < 1.0$. Every electrical system ever built has been and is powered by electrical energy extracted directly from the seething vacuum, as we explain in the present paper.

[8]. Such open systems far from thermodynamic equilibrium in the active vacuum exchange, rigorously are permitted to exhibit $COP > 1.0$ and power themselves and their loads simultaneously. By building only that subset of Maxwellian systems that forces Lorentz symmetrical regauging during discharge of the system's excitation energy, our scientists and engineers have in fact simply discarded all those Maxwellian systems not in equilibrium with the vacuum during their excitation discharge. In short, they simply do not build any such systems, or even design such. The scientific and engineering communities themselves have directly produced and maintained the present horrible energy crisis and pollution of the biosphere.

[9]. We can now show that enormous EM energy flow can be easily and cheaply initiated from the active vacuum, anywhere, at any time. The basis for this was in fact discovered by Heaviside in the 1880s. Lorentz knew of this huge energy flow component but discarded it arbitrarily, apparently to avoid being attacked and accused of being a perpetual motion advocate. See H.A. Lorentz, *Vorlesungen über Theoretische Physik an der Universität Leiden, Vol. V, Die Maxwellsche Theorie (1900-1902)*, Akademische Verlagsgesellschaft M.B.H., Leipzig, 1931, "Die Energie im elektromagnetischen Feld," p. 179-186. Figure 25 on p. 185 shows the Lorentz concept of integrating the Poynting vector around a closed cylindrical surface surrounding a volumetric element. This is the procedure which arbitrarily selects only a small component of the energy flow associated with a circuit — specifically, the small Poynting component striking the surface charges and being diverged into the circuit to power it — and then treats that tiny component as the "entire" Poynting energy flow.

[10]. The mathematical "trick" used by Lorentz to get rid of this easily and universally evoked giant negentropy, is still employed by electrical scientists and engineers without realizing what is actually being discarded. For a full explanation, see T.E. Bearden, "Giant Negentropy from the Common Dipole," *Proc. IC-2000, St. Petersburg, Russia, July 2000* (in press). A series of excellent papers by the Alpha Foundation's Institute for Advanced Study (AIAS) have also been published, approved for publication, or submitted for consideration, in leading journals. An example is M.W. Evans, T.E. Bearden et al., "Classical Electrodynamics without the Lorentz Condition: Extracting Energy from the Vacuum," *Physica Scripta*, Vol. 61, 2000, p. 513-517. A most formidable new AIAS paper, "Electromagnetic Energy from Curved Spacetime," has been submitted to *Optik* and is in the referee process. Two related paper giving a very solid basis for vacuum energy are M.W. Evans et al., "The Most General Form of Electrodynamics," and "Energy Inherent in the Pure Gauge Vacuum," both submitted to *Physica Scripta* and in the referee process. The theoretical basis for extracting copious EM energy from the vacuum is now unequivocal and either has been published or is rapidly being published in leading journals.

[11]. For example, see Myron W. Evans et al., AIAS group paper by 15 authors, "Classical Electrodynamics Without the Lorentz Condition: Extracting Energy from the Vacuum," *ibid.*; "Runaway Solutions of the Lehnert Equations: The Possibility of Extracting Energy from the Vacuum," *Optik*, 2000 (in press); — "Vacuum Energy Flow and Poynting

Theorem from Topology and Gauge Theory," submitted to Physica Scripta; — "Energy Inherent in the Pure Gauge Vacuum," submitted to Physica Scripta; — "The Most General Form of Electrodynamics," submitted to Physica Scripta; "The Aharonov-Bohm Effect as the Basis of Electromagnetic Energy Inherent in the Vacuum," submitted to Optik; — "Electromagnetic Energy from Curved Spacetime," submitted to Optik.

[12]. As an example: The most critical scientist in the Western world who is working on the "energy from the vacuum" approach, is Dr. Myron Evans, Founder and Director of the Alpha Foundation's Institute for Advanced Study (AIAS). Dr. Evans was hounded from his professorial position, has had his life threatened, has been without salary for several years, and fled to the United States for his very life. He has some 600 papers in the hard literature, and is presently producing — in accord with Dr. Mendel Sachs' epochal union of general relativity and electrodynamics — the world's first engineerable unified field theory, and an advanced electrodynamics fully capable of dealing with and modeling EM energy from the vacuum. Yet Dr. Evans lives in the United States (where he recently became a naturalized citizen) at the poverty level, can afford only one meal a day, has no automobile, no air condition, and continues epochal work under a medical condition that would stop any ordinary person less scientifically dedicated. He continues to be vilified and viciously attacked by elements of the scientific community, even though other elements are of much assistance in publishing and reviewing his papers, etc. It is a remarkable commentary upon the sad state of our organized scientific community that such a scientist and such epochal work, of such tremendous importance to both the United States and all humanity, must continue in such circumstances while community spends billions on vast projects of little significance in general, and of no significance at all in avoiding the coming world Economic collapse and the destruction of civilization. If this paper should fall into sympathetic hands which can obtain funding for Dr. Evans, then this author most fervently urges that such be accomplished at all speed. The fate of most of the civilized world may well hinge upon such a simple thing, and upon such an insignificant expenditure.

[13]. These are listed in M.W. Evans et al., "Classical Electrodynamics Without the Lorentz Condition: Extracting Energy from the Vacuum," *ibid*.

[14]. This system exists in small working prototype already, but I am under a nondisclosure agreement and cannot reveal the details of the process or the identity and location of the inventor. The system is capable of being rapidly scaled up to meet the 2003 critical milestone of "ready for mass production". One can expect up to a COP = 4 from this process.

[15]. In an electrical power system, Coefficient of Performance (COP) may be taken as the average energy dissipated in the load divided by the average energy furnished to the system by the operator. Or, it may be taken as the average power dissipated in the load divided by the average power dissipated in the input process. COP can be taken across any component, several components, or the entire system. The COP of a normal generator itself may be 0.9, for example, while when the entire system including the heater, etc. is taken into account, the system COP may be only 0.3. For $COP > 1.0$, excess energy must be furnished to the system by the external environment, while only part of the energy (or none of it) input is furnished by the operator.

[16]. The Kawai process, Johnson process, and the magnetic Wankel engine are ideal for this purpose.

[17]. T.E. Bearden, "Bedini's Method For Forming Negative Resistors In Batteries," Proceedings of the IC-2000, St. Petersburg, Russia, July 2000 (in press).

[18]. Teruo Kawai, "Motive Power Generating Device," U.S. Patent No. 5,436,518. Jul. 25, 1995. Applying the Kawai process to a magnetic motor essentially doubles the motor's efficiency. If one starts with high efficiency magnetic motors of, say, COP = 0.7 or 0.8, then the new COPs will be 1.4 and 1.6. Two Kawai-modified high efficiency Hitachi motors were in fact independently tested by Hitachi and yielded COP 1.4 and 1.6 respectively.

[19]. See T.E. Bearden, "The Master Principle of EM Overunity and the Japanese Overunity Engines," *Infinite Energy*, 1(5&6), Nov. 1995-Feb. 1996, p. 38-55; "The Master Principle of Overunity and the Japanese Overunity Engines: A New Pearl Harbor?", *The Virtual Times*, Internet Node www.hsv.com, Jan. 1996. The principle of the magnetic Wankel engine is self-evident from the drawings alone.

[20]. Johnson, Howard R., "Permanent Magnet Motor." U.S. Patent No. 4,151,431, Apr. 24, 1979; "Magnetic Force Generating Method and Apparatus," U.S. Patent No. 4,877,983, Oct. 31, 1989; "Magnetic Propulsion System," U.S. Patent No. 5,402,021, Mar. 28, 1995.

[21]. In magnetic materials, the presence of two electrons near each other and having parallel spins results in the presence of a very strong force tending to flip the spin so that they are antiparallel. The forces between the electrons due to spin geometry are exchange forces of quantum mechanical nature. In complex assemblies of different magnetic materials comprising a single stator or rotor magnet, the shapes and structures can be produced so that, as the rotor moves by the attracting stator and enters the usual back mmf zone, the powerful spin force is suddenly unleashed by the geometry, relative field strengths, and movement. This triggers the release of a violent pulse of magnetic field which greatly overrides the back mmf and strongly repels the rotor on out of this "gate" region where the exchange force is triggered. Exchange force pulses may momentarily be 1,000 times as strong as the magnetic field H , or in some cases even stronger. Evoking these responses automatically by the materials themselves, at controlled times and directions, produces the open system freely adding rotary energy from its vacuum exchanges inside the nonlinear materials. Johnson has been able to achieve this effect consistently, opening the way for a legitimate self-powering permanent magnet motor. We accent that the electrons involved are in direct energy exchange with the vacuum, and the exchange force energy comes from the violently broken symmetry in that vacuum exchange. Multivalued magnetic potentials and hence nonconservative magnetic fields arise naturally in magnetic theory anyway, but conventional scientists exert enormous effort to eliminate such effects or minimize them — when in fact what is needed is to deliberately evoke and use them to produce systems with $COP > 1.0$.

[22]. Surrounding every dipolar EM circuit there exists a vast flow of nondiverged EM energy which misses the circuit entirely and is not presently accounted (thus "dark") in electrical power systems and circuit theory. Heaviside discovered it, Poynting never realized it, and Lorentz discarded it because (a) he reasoned it was physically insignificant because it did nothing in the circuit, and (b) no one had the foggiest notion where such an enormous flow of EM energy — pouring from the terminals of every battery and generator — could possibly be coming from. The trick Lorentz used to arbitrarily discard it is still used by electrodynamicists ubiquitously. For a full background, see T.E. Bearden, "Giant Negentropy from the Common Dipole," 2000 (*ibid.*); "On Extracting Electromagnetic Energy from the

Vacuum, " Proceedings of the IC-2000, St. Petersburg, Russia, July 2000 (in press); "Dark Matter or Dark Energy?", Journal of New Energy, 2000 (in press).

[23]. Energy cannot be created or destroyed, but only changed in form. Changing the form of energy is called "work". When one joule of collected energy is "dissipated" to perform one joule of work, one still has one joule of energy remaining after that joule of work. The energy is now just in a different form. Scattering of energy in a resistor, e.g., is perhaps the simplest way of performing work, and known as "joule heating". However, for a thought experiment: If the resistor is surrounded by a phase conjugate reflective mirror surface, much of the scattered energy will be precisely returned back to the resistor as re-ordered energy, and can indeed be "used" again by scattering in the resistor to do work. There is no conservation of work law in physics or thermodynamics! If there is no re-ordering at all, then one can get only one joule of work from one joule of energy changed in form. The remaining joule of energy in different form (as in heat) is just "wasted" from the system. But if we deliberately use re-ordering (such as simple passive retroreflection), one can use the same joule of energy to do joule after joule of work, changing the form of the energy in each interaction. Eerily, most of our scientists and engineers are aware that energy can be changed in form indefinitely without loss, but will then argue that energy cannot be recycled and reused. Such is the depth of the scientific prejudice against "COP>1.0" processes and systems that many scientists are rather totally incapable of dealing with the real law of conservation of energy — which is simply that you can never get rid of any energy, at all, but can only change its form. Every joule of energy in the universe, e.g., was present not long after the Big Bang. Since then, most of those joules of energy have each been doing joule after joule of work, for some 15 billion years.

[24]. Kenneth R. Shoulders, "Energy Conversion Using High Charge Density," U.S. Patent # 5,018,180, May 21, 1991. See also Shoulders' patents 5,054,046 (1991); 5,054,047 (1991); 5,123,039 (1992), and 5,148,461 (1992). See also Ken Shoulders and Steve Shoulders, "Observations on the Role of Charge Clusters in Nuclear Cluster Reactions," Journal of New Energy, 1(3), Fall 1996, p. 111-121.

[25]. For a summary of this rapidly developing field, see Diederik Wiersma and Ad Lagendijk, "Laser Action in Very White Paint," Physics World, Jan. 1997, p. 33-37.

[26]. For the early discovery, see V.S. Letokhov, "Generation of light by a scattering medium with negative resonance absorption," Zh. Eksp. Teor. Fiz., Vol. 53, 1967, p. 1442; Soviet Physics JETP, Vol. 26, 1968, p. 835-839; "Laser Maxwell's Demon," Contemporary Physics, 36(4), 1995, p. 235-243. For initiating experiments although with external excitation of the medium, see N.M. Lawandy et al., "Laser action in strongly scattering media," Nature, 368(6470), Mar. 31, 1994, p. 436-438. See also D.S. Wiersma, M.P. van Albada, and A. Lagendijk, Nature, Vol. 373, 1995, p. 103.

[27]. For new effects, see D.S. Wiersma and Ad. Lagendijk, "Light diffusion with gain and random lasers," Physical Review E, 54(4), 1996, p. 4256-4265; D.S. Wiersma, Meint. P. van Albada, Bart A. van Tiggelen, and Ad Lagendijk, "Experimental Evidence for Recurring Multiple Scattering Events of Light in Disordered Media," Physical Review Letters, 74(21), 1995, p. 4193-4196; D.S. Wiersma, M.P. Van Albada, and A. Lagendijk, Physical Review Letters, Vol. 75, 1995, p. 1739; D.S. Wiersma et al., Nature, Vol. 390, 1997, p. 671-673; F. Sheffold et. al., Nature, Vol. 398, 1999, p. 206; J. Gomez Rivas et al., Europhysics Letters, 48(1), 1999, p. 22-28; Gijs van Soest, Makoto Tomita, and Ad Lagendijk, "Amplifying volume

in scattering media," *Optics Letters*, 24(5), 1999, p. 306-308; A. Kirchner, K. Busch and C. M. Soukoulis, *Physical Review B*, Vol. 57, 1998, p. 277.

[28]. A true negative resistor appears to have been developed by the renowned Gabriel Kron, who was never permitted to reveal its construction or specifically reveal its development. For an oblique statement of his negative resistor success, see Gabriel Kron, "Numerical solution of ordinary and partial differential equations by means of equivalent circuits," *J. Appl. Phys.*, Vol. 16, Mar. 1945a, p. 173. Quoting: "When only positive and negative real numbers exist, it is customary to replace a positive resistance by an inductance and a negative resistance by a capacitor (since none or only a few negative resistances exist on practical network analyzers)." Apparently Kron was required to insert the words "none or" in that statement. See also Gabriel Kron, "Electric circuit models of the Schrödinger equation," *Phys. Rev.* 67(1-2), Jan. 1 and 15, 1945, p. 39. We quote: "Although negative resistances are available for use with a network analyzer,..." Here the introductory clause states in rather certain terms that negative resistors were available for use on the network analyzer, and Kron slipped this one through the censors. It may be of interest that Kron was a mentor of Floyd Sweet, who was his protégé. Sweet worked for the same company, but not on the Network Analyzer project. However, he almost certainly knew the secret of Kron's "open path" discovery and his negative resistor. The present author worked for several years with Sweet, who produced a solid state device (the magnetic Vacuum Triode Amplifier) with no moving parts which produced 500 watts of output power for some 33 microwatts of input power. See Floyd Sweet and T.E. Bearden, "Utilizing Scalar Electromagnetics to Tap Vacuum Energy," *Proc. 26th Intersoc. Energy Conversion Engineering Conf. (IECEC '91)*, Boston, Massachusetts, p. 370-375.

[29]. Shoukai Wang and D.D.L. Chung. (1999) "Apparent negative electrical resistance in carbon fiber composites," *Composites, Part B*, Vol. 30, 1999, p. 579-590. Negative electrical resistance was observed, quantified, and controlled through composite engineering by Chung and her team. Electrons were caused to flow backwards against the voltage, with backflow across a composite interface. The team was able to control the manufacturing process so as to produce either positive or negative resistance as desired. The University at Buffalo filed a patent application. It first placed a solicitation to industry for developments, and offered a technical package to interested companies signing nondisclosure, then suddenly withdrew the offer. It appears to this author that a "fix" may be in place on the development.

[30]. It is fairly common knowledge that the point-contact transistor could be manufactured to produce a true negative resistor where the output current moved against the voltage. E.g., see William B. Burford III and H. Grey Verner. *Semiconductor Junctions and Devices: Theory to Practice*, McGraw-Hill, New York, 1965. Chapter 18: Point-Contact Devices. Quoting from p. 281: "First, the theory underlying their function is imperfectly understood even after almost a century..., and second, they involve active metal-semiconductor contacts of a highly specialized nature. ...The manufacturing process is deceptively simple, but since much of it involves the empirical know-how of the fabricator, the true variables are almost impossible to isolate or study. ... although the very nature of these units limits them to small power capabilities, the concept of small-signal behavior, in the sense of the term when applied to junction devices, is meaningless, since there is no region of operation wherein equilibrium or theoretical performance is observed. Point-contact devices may therefore be described as sharply nonlinear under all operating conditions." We

point out that the power limitation can be overcome by arrays of multiple point contacts placed closely together.

[31]. It is the back coupling of the magnetic field from the secondary to the primary windings that forces the dissipation of equal energy in the primary of the transformer as is dissipated in the secondary. If part of the return current in the secondary circuit bypasses the secondary of the transformer, the back field coupling to the primary is reduced accordingly. Using a negative resistor as the bypass, the bypass of the current is "for free" (powered by the vacuum and a negentropic process). Hence the result is a transformer/bypass system with $COP > 1.0$. In that case, such a system can have a positive clamped feedback from the output of the secondary circuit, into the primary to power it, while still having energy remaining to power a load. No laws of physics or thermodynamics are violated, once one understands how an EM circuit is actually powered. E.g., see Bearden, "On Extracting EM Energy from the Vacuum, 2000 (ibid.).

[32]. The Kawai process was seized in the personal presence of the present author and his CTEC, Inc. Board of Directors. We had reached a full agreement with Kawai to manufacture and sell his units worldwide, at great speed. Control of his company, his invention, and Kawai himself was taken over in our presence the very next morning, and the Japanese contingent was in fear and trembling.

[33]. The magnetic Wankel engine was developed and actually placed in a Mazda automobile. The back mmf of the rotary permanent magnet motor is confined to a very small angle of the rotation. As the rotor enters that region, a sudden cutoff of a small trickle current in a coil generates a momentary large Lenz law effect which overrides the back mmf and produces a forward mmf in that region. The end result is that one furnishes a small bit of energy to convert the engine to a rotary permanent magnet motor with no back mmf, but with a totally nonconservative net magnetic field. For details, see T.E. Bearden, "The Master Principle of EM Overunity and the Japanese Overunity Engines," *Infinite Energy*, 1(5&6), Nov. 1995-Feb. 1996, p. 38-55; "The Master Principle of Overunity and the Japanese Overunity Engines: A New Pearl Harbor?", *The Virtual Times*, Internet Node www.hsv.com, Jan. 1996.

[34]. For a history and present status of Japanese organized crime, see Adam Johnston, "Yakuza: Past and Present," Committee for a Safe Society, Organized Crime Page: Japan (available on the Internet). Michael Hirsh and Hideko Takayama, "Big Bang or Bust?" *Newsweek*, Sept. 1, 1997, p. 44-45.

[35]. As a ball-park figure for illustration, a nominal electrical circuit or power system actually extracts from the vacuum and pours out into space some 10 trillion times as much energy flow as the poorly designed "single pass" circuits intercept and utilize.

[36]. But the orthodox scientists do not know it, because they follow blindly the method introduced by Lorentz a century ago. Lorentz arbitrarily discarded all that astounding energy flow that pours from the source dipole, and retained only the tiny, tiny bit of it that strikes the circuit and enters it to power it. Nothing at all has been done since then to capture more of that huge available energy and use it. As a result of the ubiquitous Lorentz procedure, most electrical power system scientists and engineers are no longer aware that the huge unaccounted energy flow not striking the circuit even exists.

[37]. The interaction of the active vacuum with every electrodynamic system, is not modeled at all by the scientists and engineers designing and building electrical power systems. They unwittingly design every system to enforce Lorentz symmetrical regauging during excitation energy discharge, which in effect forces equilibrium in the vacuum-system energy exchange during that dissipation. Hence classical equilibrium thermodynamics rigorously applies during use of the collected energy. Such systems are limited to $COP < 1.0$ a priori.

[38]. In Nobelist Feynman's words: "We...wish to emphasize ... the following points: (1) the electromagnetic theory predicts the existence of an electromagnetic mass, but it also falls on its face in doing so, because it does not produce a consistent theory – and the same is true with the quantum modifications; (2) there is experimental evidence for the existence of electromagnetic mass, and (3) all these masses are roughly the same as the mass of an electron. So we come back again to the original idea of Lorentz – maybe all the mass of an electron is purely electromagnetic, maybe the whole 0.511 Mev is due to electrodynamics. Is it or isn't it? We haven't got a theory, so we cannot say. Richard P. Feynman, Robert B. Leighton, and Matthew Sands, Lectures on Physics, Vol. 2, 1964, p. 28-12. Also: "We do not know how to make a consistent theory – including the quantum mechanics – which does not produce an infinity for the self-energy of an electron, or any point charge. And at the same time, there is no satisfactory theory that describes a non-point charge. It's an unsolved problem." Ibid., Vol. 2, 1964, p. 28-10. In fact, "energy" itself is actually a very nebulous and inexact concept. Again quoting: "It is important to realize that in physics today, we have no knowledge of what energy is." Ibid., Vol. 1, 1964, p. 4-2.

[39]. E.g., a very recent AIAS paper, M.W. Evans et al., "The Most General Form of Electrodynamics," submitted to Physica Scripta, rigorously shows just how wrong the present limited EM theory is. Quoting: "...there can be no electro-magnetic field [as such] in the vacuum. In other words there can be no electromagnetic field propagating in a source-free region as in the Maxwell-Heaviside theory, which is written in flat space-time using ordinary derivatives instead of covariant derivatives." The reason is quite simple: spacetime is active and curved. The great John Wheeler and Nobelist Feynman, e.g., realized that EM force fields cannot exist in space, and pointed out that only the potential for such fields existed in space, should some charges be made available so that the fields could be developed on them. See Richard P. Feynman, Robert B. Leighton and Matthew Sands, The Feynman Lectures on Physics, Addison-Wesley, New York, Vol. I, 1963, p. 2-4.

[40]. Max Planck, as quoted in G. Holton, Thematic Origins of Scientific Thought, Harvard University Press, Cambridge, MA, 1973.

[41]. Arthur C. Clarke, in "Space Drive: A Fantasy That Could Become Reality" NSS ... AD ASTRA, Nov/Dec 1994, p. 38.

[42]. The internal energy available to a generator is the shaft energy we input to it. In large power plants this is usually by a steam turbine, and heat (from a nuclear reactor, burning hydrocarbons, etc.) is used merely to heat the water in the boiler to make steam to run the steam turbine. Every bit of all that is just so the generator will have some internal energy made available with which it can then forcibly make the dipole. That is all that generators (and batteries) do: Use their available internal energy to continually make the source dipole —which our engineers design the circuit to keep destroying faster than the load is powered.

[43]. By "dipole" we mean the positive charges are forced to one side, and the negative charges forced to the other. This internal "source dipole" formed by the generator or battery is electrically connected to the terminals.

[44]. This has been known in particle physics for nearly 50 years. It stems from the discovery of broken symmetry by C.S. Wu et al. in 1957. A dipole is known to be a broken symmetry in its violent energy exchange with the active vacuum. Rigorously this means that some of the "disordered" EM energy received by the dipole from the vacuum, is re-ordered and re-radiated as usable, observable EM energy. Conventional electrodynamics (and power system engineering) do not even model the vacuum's interaction, much less the broken symmetry of the generator or battery dipole in that continuous energy exchange.

[45]. A pictorial illustration of the enormity of the energy flow through the surrounding space, and missing the external circuit entirely, is given by John D. Kraus, *Electromagnetics, Fourth Edn.*, McGraw-Hill, New York, 1992 — a standard university text. Figure 12-60, a and b, p. 578 shows a good drawing of the huge energy flow filling all space around the conductors, with almost all of that energy flow not intercepted by the circuit at all, and thus not diverged into the circuit to power it, but just "wasted" by passing it on out into space.

[46]. That is, the interception of the little "boundary layer" or "sheath" of the flow, right on the surface of the wires.

[47]. Poynting never considered anything but this small little "intercepted" component of the energy flow that actually entered the circuit. E.g., see J.H. Poynting, "On the connexion between electric current and the electric and magnetic inductions in the surrounding field," *Proc. Roy. Soc. Lond.*, Vol. 38, 1885, p. 168.

[48]. In technical terms, the closed current loop circuit forces the Lorentz symmetrical regauging condition during the discharge of the excitation energy collected by the circuit. By definition, half the energy is thus used to oppose the system function (i.e., to destroy the source dipole) while the other half of the excitation energy is used to power the external losses and the load. With half the collected energy used to destroy the free extraction of energy from the vacuum, and less than half used to power the load, these ubiquitous circuits destroy their source of free vacuum energy faster than they power their loads. Hence we ourselves have to steadily input shaft energy to the generators so that they can continue to reform the dipole. In the vernacular, that is not the way to run the railroad!

[49]. Maxwell's seminal paper was published in 1864, as a purely material fluid flow (hydrodynamic) theory. At the time, the electron and the atom had not been discovered, hence the reaction of two opposite charges (positive nuclei, negative Drude electrons) in the wire was not modeled but only one was modeled, etc. Maxwell omitted half the EM wave in the vacuum and half the energy, resulting in the omission of the EM cause and generatrix of Newton's third law reaction from electrodynamics. This omission is present in mechanics and electrodynamics, where the third law reaction appears as a mystical effect without a known cause. The cause and mechanism is the omitted reaction of the observed effect back upon the non-observed cause. General relativity, e.g., does include this reaction mechanism from the effect back upon the cause. But electrodynamicists still omit half the electromagnetics, half the wave, and half the energy as is easily shown. E.g., it is demonstrated in every EM signal reception in a simple wire antenna, when the resulting perturbations of both the

positive nuclei and the Drude electrons are correctly attributed to their interactions with the incoming EM fields (waves) from the vacuum.

[50]. Mario Bunge, *Found. Phys.*, Springer-Verlag, New York, 1967, p. 176.

[51]. T.E. Bearden, "On Extracting Electromagnetic Energy from the Vacuum," *Proc. IC-2000*, St. Petersburg, Russia, July 2000 (in press).

[52]. T.E. Bearden, "Bedini's Method For Forming Negative Resistors In Batteries," *Proc. IC-2000*, St. Petersburg, Russia, July 2000 (in press).

[53]. T.E. Bearden, "Giant Negentropy from the Common Dipole," *Proc. IC-2000*, St. Petersburg, Russia, July 2000 (in press).

[54]. E.g., a good short summary is given by Dr. Theodore Loder, Institute for the Study of Earth, Oceans, and Space (EOS), University of New Hampshire, Durham, NH in his short paper, "'Comparative Risk Issues' Regarding Present and Future Environmental Trends: Why We Need to be Looking Ahead Now!", prepared for the Senate Committee on the Environment and Public Works, June 1, 2000. Certainly Dr. Loder and EOS can fully expound on the details of the biospheric pollution from the various contributing factors and processes.

[55]. One need only regard the vehement attacks by the scientific community (and much of the government including national laboratories) upon cold fusion researchers, to understand why presently many inventors and scientists in the $COP > 1.0$ open dissipative energy field are openly suspicious and distrustful of the government and government scientists, to put it mildly. Further, the U.S. Patent Office is known to be under rather explicit instructions not to issue patents on $COP > 1.0$ electrical processes and systems.

[56]. E.g., the well-known Bohren experiment produces 18 times as much energy output as the operator must input. The excess energy is extracted directly from the vacuum. There has been no program, to my knowledge, seeking to exploit this well-proven $COP > 1.0$ mechanism that has been in the hard science literature for some time. See Craig F. Bohren, "How can a particle absorb more than the light incident on it?" *Am. J. Phys.*, 51(4), Apr. 1983, p. 323-327. Under nonlinear conditions, a particle can absorb more energy than is in the light incident on it. Metallic particles at ultraviolet frequencies are one class of such particles and insulating particles at infrared frequencies are another. For independent validation of the Bohren phenomenon, see H. Paul and R. Fischer, {Comment on "How can a particle absorb more than the light incident on it?}," *Am. J. Phys.*, 51(4), Apr. 1983, p. 327.

[57]. G. Johnstone Stoney, "Microscopic Vision," *Phil. Mag.* Vol. 42, Oct. 1896, p. 332; , "On the Generality of a New Theorem," *Phil. Mag.*, Vol. 43, 1897, p. 139-142; "Discussion of a New Theorem in Wave Propagation," *Phil. Mag.*, Vol. 43, 1897, p. 273-280; "On a Supposed Proof of a Theorem in Wave-motion," *Phil. Mag.*, Vol. 43, 1897, p. 368-373.

[58]. E. T. Whittaker, "On the Partial Differential Equations of Mathematical Physics," *Math. Ann.*, Vol. 57, 1903, p. 333-355.

[59]. Evans in a private communication has pointed out that Whittaker's method depends upon the Lorentz gauge being assumed. If the latter is not used, the Whittaker method is

inadequate, because the scalar potential becomes even more richly structured. My restudy of the problem with this in mind concluded that, for the negentropic vacuum-reordering mechanism involving only the dipole and the charge as a composite dipole, it appears that the Whittaker method can be applied without problem, at least to generate the minimum negentropic process itself. However, this still leaves open the possibility of additional structuring, so that the actual negentropic reordering of the vacuum energy (and the structure of the outpouring of the EM energy 3-flow from the charge or dipole) may be much richer than given by the simple Whittaker structure alone. In other words, the Whittaker structure used in this paper should be regarded as the simplest structuring of the negentropic process that can be produced, and hence a lower boundary condition on the process.

[60]. Time-like currents and flows do appear in the vacuum energy, if extended electrodynamic theory is utilized. E.g., in the received view the Gupta-Bleuler method removes time-like photons and longitudinal photons. For disproof of the Gupta-Bleuler method, proof of the independent existence of such photons, and a short description of their characteristics, see Myron W. Evans et al., AIAS group paper, "On Whittaker's F and G Fluxes, Part III: The Existence of Physical Longitudinal and Time-Like Photons," *J. New Energy*, 4(3), Winter 1999, p. 68-71; "On Whittaker's Analysis of the Electromagnetic Entity, Part IV: Longitudinal Magnetic Flux and Time-Like Potential without Vector Potential and without Electric and Magnetic Fields," *ibid.*, p. 72-75. To see how such entities produce ordinary EM fields and energy in vacuo, see Myron W. Evans et al., AIAS group paper, "On Whittaker's Representation of the Electromagnetic Entity in Vacuo, Part V: The Production of Transverse Fields and Energy by Scalar Interferometry," *ibid.*, p. 76-78. See also Myron W. Evans et al., AIAS group paper, "Representation of the Vacuum Electromagnetic Field in Terms of Longitudinal and Time-like Potentials: Canonical Quantization," *ibid.*, p. 82-88.

[61]. For a short treatise on the complex Poynting vector, see D.S. Jones, *The Theory of Electromagnetism*, Pergamon Press, Oxford, 1964, p. 57-58. In a sense our present use is similar to the complex Poynting energy flow vector, but in our usage the absolute value of the imaginary energy flow is equal to the absolute value of the real energy flow, and there is a transformation process in between. This usage is possible because the imaginary flow is into a transducer, which takes care of transforming the received imaginary EM energy into the output real EM energy. We stress that the word "imaginary" is not at all synonymous with fictitious, but merely refers to what "dimension" or state the EM energy exists in.

[62]. Unfortunately electrical engineers use the term "power" to also mean the rate of energy flow, when rigorously the term "power" means the rate at which work is done. We accent that we fully understand the difference, but are using the terminology common to the profession.

[63]. Nobelist Prigogine experienced something very similar when he proposed his open dissipative systems, where the system operations did not lead to the conventional increasing disorder. To say that he was subjected to the Inquisition is not an exaggeration. Other scientists have repeatedly been subjected to intense scientific attack and suppression — including Mayer (conservation of energy), Einstein (relativity), Wegener (drifting continental plates), Ovshinsky (amorphous semiconductors), to name just a few of the hundreds who have been attacked in similar fashion. Science does not proceed by sweet reason, but by a vicious dogfight with no holds barred. It delights in "wolf pack" attacks upon the scientist with a new idea or discovery.

[64]. And the scientific community is certainly not prepared for the notion of using time as energy, freely and anywhere. In a sense, one can "burn time as fuel". Consider this: In physics, the choice of fundamental units in one's physics model is completely arbitrary. E.g., one can make a quite legitimate physics model having only a single fundamental unit (such is already done in certain areas of physics). E.g., suppose we make the "joule" (energy) the only fundamental unit. It follows then that everything else — including the second and therefore time — is a function of energy. One can utilize the second as c^2 joules of energy. Hence the flow of time would have the same energy density as mass. After Einstein, the atom bomb, and the nuclear reactor, of course, we are all comfortable with the fact that mass is just spatial energy compressed by the factor c^2 . So we really should not be too uncomfortable at the notion that time itself is energy compressed by the factor c^2 . In this case, if every second of the passage of time, we were to convert one microsecond into ordinary EM spatial energy, we would produce some 9×10^{10} joules of EM energy. Since that is done each second, this would give us the equivalent of the output of 90 000-megawatt power plants. If only 1.11% efficient, the conversion process would yield the equivalent of one 1000-megawatt power plant.

In fact, it is in theory possible to do such a conversion, and we have previously indicated the various mechanisms involved. There are also some rough experimental results that are at least consistent with the thesis. The interested reader is referred to T.E. Bearden, "EM Corrections Enabling a Practical Unified Field Theory with Emphasis on Time-Charging Interactions of Longitudinal EM Waves," *J. New Energy*, 3(2/3), 1998, p. 12-28. See also the author's similar paper with the same title, in *Explore*, 8(6), 1998, p. 7-16. We believe that the real energy technology for the second half of this century is based on use of time for fuel. The fundamental reactions and principles also enable a totally new form of high energy physics reactions, where very low spatial energy photons are the carriers (their time components carry canonical time-energy, so that the highest energy photons of all, given time-energy conversion, are low frequency photons. These new reactions (given in the references cited) are indeed consistent with the startling nuclear transformation reactions met at low (spatial) photon energies in hundreds of successful cold fusion experiments worldwide.

[65]. A classic example is given by Paul Nahin in his *Oliver Heaviside: Sage in Solitude*, IEEE Press, New York, 1988, p. 225. Quoting: "J.J. Waterston's paper on the kinetic theory of gases, in 1845, was rejected by the Royal Society of London. One of the referees declared it to be 'nothing but nonsense, unfit even for reading before the Society.' ... "Waterston's dusty manuscript was finally exhumed from its archival tomb forty years later, because of the efforts of Lord Rayleigh..." Our comment is that the same scientific attitude and resistance to innovative change prevails today. As the French say, "Plus ça change, plus c'est la même chose!"

[66]. E.g., see G. Nicolas and I. Prigogine, *Exploring Complexity*, Piper, Munich, 1987 (an English version is *Exploring Complexity: An Introduction*, Freeman, New York, 1989); Ilya Prigogine, *From Being to Becoming: Time and Complexity in the Physical Sciences*, W.H. Freeman and Company, San Francisco, 1980. In 1977 Prigogine received the Nobel Prize in chemistry for his contributions to nonequilibrium thermodynamics, especially the theory of dissipative structures.

[67]. The interested reader is referred to Andrew A. Marino, *Powerline Electromagnetic Fields and Human Health*, at <http://www.ortho.lsumc.edu/Faculty/Marino/Marino.html>. Particularly see "Chapter 5, Blue-Ribbon Committees and Powerline EMF Health Hazards,"

and "Chapter 6: Power-Industry Science and Powerline EMF Health Hazards." Biophysicist Marino is one of the leaders in the field and has been personally involved in many skirmishes with powerline-dominated studies and findings. As an example, quoting from Chapter 6: "Neither scientists nor the public can rely on power-industry research or analysis to help decide whether powerline electromagnetic fields affect human health because power-industry research and analysis are radically misleading." There are many other reports in the literature which also show effects of EM nonionizing radiation on cells, including detrimental effects.

[68]. Becker studied not just the immune system — which "heals" nothing at all, not even its own damaged cells — but also the cellular regenerative system. He and others found, e.g., that tiny trickle currents and potentials — either steady or pulsed — placed across otherwise intractable bone fractures, would result in a rather astounding set of cellular changes which led to healing of the fracture by deposit of new bone. Eerily, Becker showed that the red blood cells coming into the area and under the EM influence, would shuck their hemoglobin and grow cellular nuclei (i.e., dedifferentiate back to an earlier cellular state). Then these cells would redifferentiate into the type of cells that made cartilage. Then those cells would differentiate into the type of cells that make bone, and be deposited in the fracture to "grow bone" and heal the fracture. Incredibly, this is the only true "healing" modality in all Western medical science — which is otherwise built upon the theory of intervention rather than healing. After the intervention (which may be quite necessary!), the body's cellular regenerative system — or what is left of it after damage by such interventions as chemotherapy, etc. — is left entirely upon its own to restore the damage (heal the damaged cells and tissues). Becker was twice nominated for a Nobel Prize. But because he also testified in court against power companies, giving testimony as an expert witness that EM radiation from power lines could indeed induce harmful conditions in some exposed people, he was suppressed and eventually forced to retire.

[69]. See Robert O. Becker and Andrew A. Marino, *Electromagnetism and Life*, State University of New York Press, Albany, 1982. This reference gives a nice summary of EM bioeffects from the orthodox view, current as of the publication date. For Becker's work with the cellular regenerative system, see particularly R.O. Becker, "The neural semiconduction control system and its interaction with applied electrical current and magnetic fields," *Proc. XI Internat. Congr. Radiology*, Vol. 105, 1966, p. 1753-1759, Excerpta Medica Foundation; Amsterdam. See Becker, "The direct current field: A primitive control and communication system related to growth processes," *Proc. XVI Internat. Congr. Zoology*, Washington, D.C., Vol. 3, 1963, p. 179-183.

[70]. For an overview of the ansatz of present battery technology, see David Linden, Editor in Chief, *Handbook of Batteries*, Second Edition, McGraw Hill, New York, 1995; Colin A. Vincent and Bruno Scrosati, *Modern Batteries: An Introduction to Electrochemical Power Sources*, Second Edition, Wiley, New York, 1997. For a process to make a battery include a negative resistor and exhibit COP>1.0, see Bearden, "Bedini's Method For Forming Negative Resistors In Batteries," *Proc. IC-2000*, St. Petersburg, Russia (in press).

[71]. Such laboratories are private and professional testing companies, where the U.S. government has certified their expertise and qualifications, their testing to NIST, IEEE, and U.S. government standards, their use of calibrated instruments, and the experience and ability of their professional test engineers and scientists. Such labs are routinely and widely used by aerospace firms, e.g. A Test Certificate from such a lab is acceptable by the courts,

the U.S. Patent and Trademark Office, the U.S. government (which requires it on many contracts), and by the U.S. scientific community. A goodly number of these laboratories are available throughout the U.S.

[72]. As an example, for decades Castro ran guerrilla and agent training camps in Southern Mexico. Many of the graduates of those camps — trained terrorists all — have been infiltrated across the U.S. border and into the U.S., to bide their time and wait for instructions. Some estimates are that several thousand such Castro agents alone are already on site and positioned for sabotage, poisoning of water supplies, destruction of transmission line towers, destruction of key bridges, etc. Several other nations hostile to the U.S. are also known to have agent teams already on site within the U.S., The new form of warfare/terrorism is to introduce the "troops" into the adversary's nation and populace in advance, as well as weapons caches, etc. So such preparations have definitely been accomplished within the United States, and undoubtedly some are still in progress and ongoing.

Chasing The Wild Dragon Foundations of a New Science

There is a new "rebel" science slowly being born, with most of the work being done outside the universities and orthodox scientific community. In the months ahead it will be my job to try to acquaint you with the gist of what's going on, and what all the excitement is about.

This first article is deliberately just introductory, and its purpose is to interest you in the unusual fields we are going to be covering in more scientific detail, in future columns. We will also be listing a variety of references from the technical literature, which bear upon the various points addressed.

The work toward a new breakthrough science is going on in a broad spectrum of "fields," most of which are not yet recognized by academia as even constituting legitimate areas of scientific endeavor (Table 1).

Some of the major areas involved are:

- theoretical and experimental research in overunity electrical machines
- free energy research of other kinds, such as devices utilizing thermodynamics phase changes
- rapidly advancing efforts in cold fusion
- work on permanent magnet motors
- antigravity research, both theoretical and experimental
- development and utilization of a "hidden" electrostatics inside the scalar potential (inside voltage)
- the "memory" of space and materials; where this "memory" can be deliberately conditioned so that space and the materials themselves become causal actants rather than simple inert entities
- direct engineering of quantum change via a new kind of "hidden electrodynamic variables"
- the direct engineering of the vacuum's virtual photon flux exchange with matter
- action at a distance, including the deliberate formation and usage of quantum potentials
- direct engineering of the local curvature of spacetime (yes, the direct engineering of general relativity, using the new hidden kind of electrostatics)

- use of the new "hidden" electromagnetics to engineer body cells including the reversal of diseased cells, genetics and all, back to a previous healthy state (cellular dedifferentiation, in biophysical terms, or cellular phase conjugation, in physics terminology)
- research toward the direct engineering of the mind, including both the conscious and unconscious minds, long-term memory, and the personality itself
- a ruthless re-examination (and correction where necessary and possible) of the definitions, concepts, and postulates that present physics is founded upon

Talks About Weaponry The Zoh Show

One of the greatest man-induced dangers... is the development of *electromagnetic frequencies* to be used as wave warfare. In April of 1997 Secretary of Defense William Cohen admitted he was concerned about threats of terrorism with weapons that can *cause earthquakes and trigger volcanoes*.

Over the years we have shared with our audiences many different approaches to the subject of quantum mechanics, the work of Nikola Tesla, the concerns about ELF wave warfare, mind control, and other technological nightmares predicted by the misuse of these technologies. Investigators and researchers in these areas often refuse to speak publicly about their work, and usually Lt. Tom Bearden is one of them.

When asked, Bearden typically declines to share his knowledge about our government's involvement in *behavioral weaponry*, lecturing instead on the many other facets in his amazing repertoire. Indeed, there are other lecturers speaking publicly about behavioral weaponry, but often they are sent by the government to assure the public this stuff doesn't go on.

But on May 16, 1997, however, Tom Bearden kept his promise, and agreed to be a guest on The Zoh Show and tell her audience what he knows about electromagnetic weaponry... he has discontinued public speaking about his knowledge, until this date, twenty years later, on May 16, 1997 when he joined *The Zoh Show* to help promote the *New Energy Conference* of May 1997, and fulfill his twenty year old promise.

Zoh asked Tom to give his own rendition of his biography.

SCIENCE NEEDS TO CONSIDER HUMAN-NESS

"One of the things that I wanted to see was a science that was more humane, that considered human beings as well as materialism. Fortunately, quantum mechanics destroyed materialism about sixty-something years ago but unfortunately it hasn't fallen down yet. It's dead but it's not toppled over, and unfortunately most of our scientists are still materialists," meaning they believe that the brain is where all the action is. In their belief, he says, "there's no such thing as an independent mind or independent spirit or anything."

Tom is reluctant to discuss our military's involvement in electromagnetic warfare because he doesn't want to be "gagged"....

ELECTRONIC WEAPONS DEVELOPMENT

In general, however, Tom will say, "Most of our attention in the west has been focused on what we call *Directed Energy Weapons*, where we actually just bang the energy out in the normal fashion, and we try to get lots of it out there, ... That's basically what kinds of weapons, the west at least, overtly anyway, has been working on. In the KGB laboratories, the cream of the non-linear scientists of the whole world are the Russian scientists, always have been. Those folks worked on this other stuff and they were working on it shortly after the end of

World War II. In 1947 they were working on it like mad and so by 1950 they were testing prototype laboratory weapons.

Particularly by the latter 50s they actually had pretty good solid weapons systems and prototype coming along. The first large strategic weapons that they deployed, the real big monsters were deployed in early 1963.... The reason for the Cuban missile crisis was: in backing Castro the Russians wanted to change the whole balance of power and stick in nuclear weapons, but they also knew they had these super weapons coming along. Khrushchev had spoken of those in 1960. Part of that was printed in the *New York Times*...

What [Khrushchev] did was he just sort of jumped the gun, because his big stuff was not deployed yet, and when Kennedy called his bluff in 1962 he didn't have the big guns behind him and his missiles were in woeful shape...

Then he vowed revenge. When those things were deployed, of course, he had lost face seriously before the whole world and particularly before the Communist party. So Khrushchev's days were numbered shortly after the Cuban Missile Crisis. He was desperate to try and stay in power.

DRAMATIC TEST OF WEAPONRY

"...1962 was the *Cuban Missile Crisis*, as soon as those things got deployed a few months later, in April 1963, he did a tremendous dramatic test of the weaponry. First he killed the U.S.S. Thresher underneath the ocean off the coast of the U.S., left signatures a mile wide. The next day he placed an underwater burst of this energy, gigantic burst 100 miles north of Puerto Rico, one of the deepest parts of the oceans and we had a passing jet airliner which happened to see the surface of the ocean ball up and rise up about 1/2 a mile high in a mushroom cloud and fall back into the ocean, the symptoms of an *underwater nuclear burst* if you don't vent the gas bubble... the thing is he did get his revenge and he did demonstrate to the Communist party that the weapons were workable and they would destroy, for example, the finest attack submarine we had of the day."

"...In general there's a "*system within the system*" in Russia. First of all you've got the Communist party which is really the dominant system, and it still is today. It's sort of lying dormant a little bit today, but not really. It still controls the KGB, and the KGB still has all the powers that it wants to exercise. And it always did control and have the development systems for the advanced weapons of the kind that I was talking about, where you use a different kind of electromagnetics. We pointed out that two papers, one in 1903 and one in 1904 by E.T. Whittaker, give you the way to go about constructing and using this new electromagnetics.

SUPER POTENTIAL THEORY

"...That last paper was used to establish what today is called Super Potential Theory and very few people work in it but it's known. The first paper was completely ignored and it gave you the ability... to create energy at a distance. It does not flow through space as normal EM [electromagnetic] Waves. It's not ELF [extremely low frequency]. It's not like your normal radio broadcasting system at all. It's really like a DC voltage that doesn't have anything going on on the surface but down underneath it has pressure waves, and the pressure waves bang into the system on the other end and create real electromagnetic energy on that end.

Putting it simply... there's no such thing as a shield for it. So obviously that kind of weaponry is head and shoulders above anything else we normally look at including firing a laser beam here at something up there, you know, and with it going through the air in the normal fashion... What happens at the other end is the energy rises directly as out of the local vacuum the actual space time the thing's embedded in."

WHAT IS SCALAR ENERGY?

To define scalar energy, Tom drew an analogy. "Suppose you have an ocean -- after all, we know today that space itself is a special kind of ocean. It's filled with enormous flux activity. It's not an emptiness at all, sort of like a special kind of sea or ocean. The waves that you have on the surface where the water has to rear up, be physically lifted up, and moved energetically, that compares to a *normal electromagnetic wave*. Those waves move pretty slow on the surface of the water.

Now underneath the water if you sort of had a little flat plate area and you bang this plate very sharply with a little shock wave, you get a pressure wave that goes through the water. This pressure is just a transmission of pressure... In other words you have a hidden type of wave that buries up to what we would say in space time, if

you want to talk general relativity, or better yet to look at it materially the way that Whitaker did and so forth, it simply infolds inside the scalar potential, what we normally call just DC voltage."

THEY KILLED THREE AMBASSADORS

Working in scalar energy "can do a lot of good as well as a lot of bad," says Tom Bearden. "Let's talk about some good and bad that you can do in terms of human beings. First of all, a Russian scientist named Kosnoshev who headed up a research institute in Siberia in those days did some enormously important work.... As far as everybody else was concerned [he demonstrated] openly just normal electromagnetics -- but it wasn't.

It was the special stuff. He demonstrated that any kind of cellular disease whatsoever, without limitation, can be captured and transmitted into other cells at a distance using this *special kind of* electromagnetics. They did about 18,000 experiments, and research institutes can prove this. And so, of course, the KGB and so forth started weaponising that effect very highly. You know for years [they used] the so-called *microwave radiation* on the U.S. Embassy in Moscow where they induced all kinds of health changes. This was a limited test deliberately kept very small, although they did kill three ambassadors."

ENGINEERING THE VACUUM

"...Wheeler, one of the great physicists of this country, pointed out that if you condense energy like in mass or you have a cloth of energy, that affects the actual fabric of space time itself. It's like it pushes the sheet, makes a lump in it." Zoh likened it to dropping a child's ball on his bed and the sheet gets a bump in it.

"It changes it," continued Tom. "It's an engine. In return the geometry gets twisted up, interacts back on the mass. Mass tells space time how to curve, space time curvature tells mass how to move. This operates at all levels and all you have to do is capture these little clumps of energy, make a pattern of them that you need, and that's called engineering the vacuum. We just call it *vacuum engines*.

"So you can make these little pockets of energy in the actual vacuum itself and the emptiness in front of you, little energetic dispositions. It's got forces in it once mass is put there. There are little invisible fingers that are little engines and they work on the mass. They work inside the nucleus. They work wherever you design them for."

"...There's two kinds of frequency there. There's the frequency that exists up on the surface of the ocean and then there are these jillions of frequencies that are hidden down underneath the ocean. Those are the ones that we're talking about." While Bearden and other teams of scientists world over are trying to learn how to use that available energy to heal and to change the disease state, *it can also be used to kill*.

THE ULTIMATE BIOLOGICAL WARFARE

"It's the ultimate biological warfare, of course," continues Thomas Bearden. "I'll say this flatly, and I won't answer any further questions about it; the *Gulf War Syndrome* was induced... It was induced with this stuff. All the rest... was contributing factors that everybody's talking about... There are some deeper signatures if you look into it very deeply that show you exactly how it was done and the fact that it was induced. It was a test. It was a test of a very special kind of weapon I have not talked about yet. Anyway you can use it to create diseases.

Transforming Cells Forward Or Backward

"You can just as easily use it to *cure diseases*," continues Bearden. For example there were experiments in France in the early 1960s when they cured lab animals of terminal tumors and other vicious infections like the sleeping sickness using internal electromagnetics -- without knowing what they were doing. The late Christopher Bird wrote about the whole history of that project.

"But nobody could explain how it worked.... What they were able to do was just back the cell up. Once the cell was infected or diseased or whatever, like in a cancer cell, they just reversed it back to a normal cell. They didn't kill the cell. That's not what you do. You just change it back and forth."

Nobel Prize nominee Robert Becker also showed conclusively that extremely minute amounts of electricity can induce healing, a practice now approved by the FDA for use in healing bone fractures in hospitals everywhere. Unfortunately millions of people continue to suffer needlessly when electromagnetic healing could cure them of numerous ailments and illnesses, but the FDA will not approve its use elsewhere..... There's been absolutely no [development] in this country, even looking at this internal electrodynamics, even though it's been in the hard literature for almost a century."

THE BUREAUCRACY IN SCIENCE

"One problem is all science is patronized, that is, ... somebody has to pay the bills.... The bureaucracy in science that controls the money flow, what money shall be spent and what it shall be spent for controls all of science. What people do not realize is science is not free at all in this country -- it is highly constricted. There are plenty of bright, young Ph.D.s that would love to work on this kind of thing, but the scientific community will not allow them because the bureaucracy will not give them any funds. And if they try to work on their own in this area they get destroyed, pure and simple.

"...The other thing is scientists like to glorify themselves, but they form a distribution just like any other group of people. The broad in the middle are people just like you and I doing a special job. They're no better, no worse. There's a small percentage of them that are angelic almost. They are really the epitome of the scientists. There is also a small group on the bottom, the end of it, the bottom 11% that are nearly devils, and they are manipulative and they try to rise and control everything, and they are interested only in the big money game, who's got the money, who controls.

Governments of the world have been made beasts of burden for large control interests anyway, not just one, but all kinds of control interests... And so what you have is all these competing interests using power, influence and money, and all buying everything. And that's what controls what science works on. That's why you don't get free energy. Free energy can be done anytime anybody wants to spend a little money. It's slowly being done anyway."

Scalar Electromagnetics and Weather Control Anomalous Weather Worldwide

The anomalous weather worldwide is not accidental. In superpotential theory, which was initiated by a paper by E.T. Whittaker in 1904, it is possible to produce EM force fields and force field energy at a distance.

Whittaker 1904 showed that all EM fields and waves can be decomposed into two scalar potential functions. It follows that, by assembling two such scalar potential functions in beams, one can produce a "scalar potential interferometer" where the potential beams intersect at a distance. In that interference zone, ordinary transverse EM fields and energy appear.

A scalar potential is also just a harmonic assembly of bidirectional longitudinal EM wavepairs, as shown in a paper by E.T. Whittaker the year before, 1903. So one can produce the necessary longitudinal waves, in arrays, to "assemble" a scalar potential with any desired interior LW composition. Thus by using longitudinal EM waves (LWs), one can produce potentials, fields, and waves to order. It turns out that a longitudinal EM wave, since it cannot vary transversely a priori, cannot vary its 3-spatial energy density. Instead, it must vary in the time domain. What results is that one has created an oscillation of the curvature of spacetime, when one makes a longitudinal EM wave.

Now one can engineer clusters of ST curvatures, by proper assembly of LWs. This is a very powerful general

relativity, because the strong EM force is being used as the agent of ST curvature. This particular EM GR does not appear in the textbooks, but has been utilized by the Russian KGB in clandestine weapon development since the 1950s.

Here's how the weather engineering is usually accomplished:

First, take two scalar potential beam transmitters, separated on the necessary baseline to form a beam interferometer. Let them interfere at a distance. Now in that distant interference zone (IZ), there is an ambient vacuum potential (spacetime potential, or spacetime stress). If the electrical circuit grounds of the interferometer transmitters are biased ABOVE the ambient potential in the IZ, then scattering EM energy (heating) emerges in the IZ. This is the exothermic mode of operation. If the electrical circuit grounds of the interferometer are biased negatively below the ambient potential in the IZ, then convergent EM energy (cooling) emerges in the IZ. This is the endothermic mode of operation.

So by merely biasing the electrical grounds of a scalar potential interferometer, one can produce heating or cooling in the distant IZ. If one just "radiates," one produces distant steady heating or steady cooling. If one sharply pulses the interferometer, one produces a distant hot explosion or a distant cold explosion. One can also, of course, form various forms of energy at a distance, including particularly hemispheric shells of energy and spherical shells of energy. Hundreds of these have been observed worldwide, from testing by the KGB weapons in Russia.

There is one other characteristic that one needs to be aware of. Pure longitudinal EM waves have infinite speed and infinite velocity (see the summary papers by Rodrigues et al. on the Los Alamos National Laboratory website). In practice one makes a pseudo-longitudinal wave, so its energy is finite and its speed is finite, but it may have a velocity $v \gg c$.

A "scalar" potential is not a scalar entity at all. Instead, it's a bundle of bidirectional longitudinal waves, as shown by Whittaker 1903. Mass is composed mostly of empty space filled with potentials and fields, with a particle here and there, widely separated. On its own scale, a "mass" looks more like a giant solar system or the external universe. Mostly space, with fields and potentials. Well, since fields and potentials are nothing but just LWs anyway (W-1903 and 1904), then the stress potential of space is a superhighway for LWs. What this means is that "pretty good" LWs (i.e., sufficiently clean pseudo longitudinal waves) will pass right through the earth and ocean, with little attenuation and little interaction.

Now we are ready to see into weather engineering.

Focus the interference zone (IZ) on the other side of the earth (beam right through the earth and ocean) to a given desired area in the atmosphere. Bias your transmitters positively. You produce atmospheric heating in the air in the IZ, so that the air expands and you have produced a "low" pressure zone. Now use a second interferometer biased negatively, and place it at a distant IZ desired. In that IZ, you cool the air so that it shrinks and becomes denser, and you have created a "high" pressure area. Now place several such IZs, with the desired highs and lows, near a jet stream. The jet stream will be deviated toward a low and away from a high. By varying the transmitted energy and the IZ location (just move it gradually along), you can entrain and steer the jet streams, and therefore effectively "steer" the resulting weather.

Want to spawn tornadoes? Just make several sharp bends in the jet streams, and also speed them up a bit. The additional angular momentum imparted to the air masses will spawn off littler rotations (tornadoes). By focusing the IZ underneath the ocean, one can heat or cool the water in a selected area, over a period of time. So you can aggravate or ease El Niño, e.g. By proper steering and coordination around the earth, the KGB is able to,

- create a great deal of rain in an area
- a drought in an area
- storms and tornadoes
- a powerful El Niño
- etc.

Want to really mess with the troops? Just focus the IZ in a large fault zone -- say such as the San Andreas fault in California. Use the exothermic interferometry mode. You deposit energy slowly in that fault zone. The stress increases. Eventually the plate edges shift, and you have an earthquake. If you want a very powerful quake, put the energy in gradually, so that a sort of "overpotential" or "overpressure" builds up, past where the rocks would normally slip. Then when they let go, you've got a real nice big one. You can see what might happen if one also toys around with a sleeping volcano.

On July 4, 1976 the KGB began its massive and continuing weather engineering over North America. It

continues to this day. So the anomalous weather everyone is worrying about, is going to STAY anomalous. In fact, it's going to get a bit worse. There's a whole war going on out there.

It might surprise you, e.g., that electrodynamics actually has nothing at all to say about the form of its EM entities in space, where there is no mass. Maxwell assumed a material ether, and all his EM entities are mass-containing. The force fields are rigorously defined only in the presence of mass, and only as the INTERACTION of the spacetime disturbance with an intercepting charged mass. So Maxwell's EM still contains a material ether, even though the Michelson-Morley experiments destroyed a material space medium in the 1880s (after Maxwell was already dead). Not a single Maxwellian equation has been changed!

Rigorously, Maxwellian EM is a set of matter-to-matter transforms. Actually infolded inside its transforms are a missing two:

(1) Matter-to-spacetime transform, which is really what is invoked when one launches a "signal" from a transmitter; one launches a spacetime curvature oscillation, not a force field oscillation, because no force fields exist in space in the absence of mass (Feynman, Wheeler, Aharonov, Bohm, Lindsay, Margenau, etc.)

(2) Then the ST perturbation propagates through space to the waiting receiving antenna. There it interacts with the Drude electrons, producing the well-known transverse EM oscillations.

Since the electrons are constrained longitudinally down the wire and are spinning, they act as gyros. So they precess laterally, which is actually what we measure with our instruments -- the gyroprecession of the charges. So hidden inside the matter-to-matter EM they erroneously teach us, is an infolded general relativity (a matter-to-spacetime transform, followed by a spacetime-to-matter transform in serial order).

This is the "magical" unified field theory everyone has been seeking. The electrodynamics we teach is a piece of tripe, and the Russians just secretly corrected it back in the early 50s. And then they weaponized the daylight out of it. Today at least three other nations besides the KGB rogue group in Russia have scalar potential interferometer weapons. The weather engineering is just one of the EARLY capabilities. The most powerful weapons on earth are not nuclear. They are quantum potential in nature, using a modified Whittaker EM to implement David Bohm's hidden variable theory of quantum mechanics.

Meanwhile, since our own electrical physicists have rather thoroughly failed us, and just keep teaching the horribly flawed old electrodynamics, we will continue to watch as the weather is hostilely engineered, as even earthquakes are engineered from time to time, and as another small nation which must remain unnamed, saves us and prevents our destruction.

Didn't know whether such things would even interest you, but thought I'd expose them anyway. Most scientists are very uncomfortable with even the notion that something substantial is wrong with our physics texts. But such is true. Until we do the necessary foundations overhaul, we will continue to teach and use a highly inferior science. And we will continue to see more and more anomalous weather. Incidentally, the KGB weapon scientists call the infolded LWs (curvatures of ST) inside electrodynamics, the information content of the field. Our guys just think they are referring to spectral analysis. The Russians call the entire science energetics.

You can see the earlier version of the Rodrigues paper in Foundations of Physics, 27(3), 1997, p. 435-508. Whittaker's papers are:

(1) "On an expression of the Electromagnetic Field Due to Electrons by Means of Two Scalar Potential Functions," Proc. Lond. Math. Soc., Series 2, Vol. 1, 1904, p. 367-372;

(2) "On the Partial Differential Equations of Mathematical Physics," Math. Ann., Vol. 57, 1903, p. 333-355.

- A summary of superpotential theory is given by Melba Phillips, "Classical Electrodynamics," Vol IV of Principles of Electrodynamics and Relativity, Ed. by S. Flugge, Springer-Verlag, Berlin, 1962, p. 1-108.
- Other scientists such as Debye, Nisbet, Bromwich, and McCrea contributed to the foundations of superpotential theory.
- An excellent and eye-opening paper is Patrick Cornille, "Inhomogeneous Waves and Maxwell's Equations," Chap. 4 in Essays on the Formal Aspects of Electromagnetic Theory, World Scientific, Singapore, 1992, p. 6-86.
- Highly recommended is T.W. Barrett and D.M. Grimes, Eds., Advanced Electromagnetism: Foundations, Theory, & Applications, World Scientific, New Jersey, 1995.
- For a test of a superweapon, see Walker et al, "Kaitoku Seamount and the Mystery Cloud of 9 April 1984," Science, Vol. 227, Feb. 8, 1985, p. 607-6111.

See also Daniel L. McKenna and Daniel Walker, "Mystery Cloud: Additional Observations," Science, Vol. 234, Oct. 24, 1986, p. 412-413. That incident on April 9, 1984 off the coast of Japan and near the Kuriles, was a

huge test of (1) a cold explosion just over the surface of the ocean, which suddenly shrank the air so that surrounding air rushed in, meeting and surging upwards into the sky, entraining lots of water as a mist and dense cloud with it. Then a second test was conducted: a glowing sphere of light appeared in the top of the large mushroom cloud from the cold explosion. Then that spherical globe expanded, until it reached some 380 miles in diameter. The center of the globe at that time was about 200 miles altitude. That is written up in two fine articles in the respected journal Science.

This is the scale the KGB has been operating on, with these interferometry weapons. There are hundreds more such incidents or similar.

Interview With T.E. Bearden 1991

Question 1: Can you offer the layman an extremely simplified summary of what scalars are, how they relate to Maxwell's equations, unified field theory, and the limitations of currently accepted quantum physics, relativity theory, and electromagnetics?

A: Whew! You've asked for a complete explanation of how to unify the three major disciplines of physics, specify what's wrong with the three present versions of those disciplines that has prevented their unification, and how this was in Maxwell's original quaternion equations (some 200 of which are actually his theory, not the pale four vector equations written by Heaviside and Gibbs). You also asked for an explanation of scalars versus vectors, and how the present vector analysis (of Heaviside and Gibbs) misses the boat with respect to structured scalars. And you've asked me to do it simply, in layman's terms. To say that that's a tall order is the understatement of the decade!

Okay, we'll have a go at it anyway. We'll start with scalars and vectors.

Basically we visualize things in the universe as two sorts those that move (have motion) and those that don't. In physics we know already that this is in error; there isn't anything in the universe, anywhere, that is motionless. At least it is moving through time, which is still a special kind of motion. Also, we know that everything seems to be made up of much finer things, and these finer things are always in motion - often very violent motion. So what we observe as a passive thing - sitting still spatially, so to speak - is made up of subthings in violent motion spatially. And the whole system that is not moving spatially is still moving in time. However, we don't see "time" but just space; therefore we see the thing as "motionless." However, the "motionless" thing we look at is rather like a fixed whirlpool in a swiftly flowing river the whirlpool seems to us to stay "fixed" and motionless, but internally its parts (the flowing water) are in constant motion.

Another example is a container of gas under pressure - such as the air tank at the service station. The tank and "the air as a whole spatial volume" isn't going anywhere, and we see them as "motionless." But inside the gas its molecules are in violent motion, undergoing collisions, etc. Indeed, inside the walls of the tank, the molecules and atoms are in vibrational back-and-forth motion in a spatial lattice.

The point is, physically "motion" and "motionless" only apply to the external characteristics of the object to which we pin the label. So it represents only an overall characteristic of the object, and does not completely describe it. In a sense "motionless" is filled with motion, and all is motion.

In vector analysis, a scalar quantity is considered to be a quantity that has magnitude or size, but no motion. An

example is pressure; the pressure of a gas has a certain value of so many pounds per square inch, and we can measure it, but the notion of pressure does not involve the notion of movement of the gas through space. Therefore pressure is a scalar quantity, and it's a gross, external quantity since it's a scalar. Note, however, the dramatic difference here between the physics of the situation and mathematics of the situation. In mathematics, when you say something is a scalar, you're just speaking of a number, without having a direction attached to it. And mathematically, that's all there is to it; the number doesn't have an internal structure, it doesn't have internal motion, etc. It just has magnitude - and, of course, location, which may be attachment to an object.

However, physically, when we say something has pressure or a scalar value, that is not all there is to it. That particular aspect of the object or system may be scalar, but internally the thing it's labeling can still be decomposed into subsystems or particles or small things in violent motion. That is, in physics the scalar quantity can mathematically be further decomposed into an ensemble of vector quantities. Since these parts are rushing around in all directions but the whole is not translating through space, then obviously the sum of all those fractional motions must be zero. Scalar pressure, for example, can be decomposed into a myriad of opposing force vectors per unit area.

Mathematically, a vector is an entity that not only may have magnitude or size, but is translating through space. In physics, we apply the vector concept to something that is moving, and/or to position. However, when we think further, that "something" is made of smaller things, which also are in violent motion, and these smaller things may be swarming all over the place with differing velocities - or even flowing at high speed in and out of the moving "system- thing" represented by the vector. So even here, the vector thing is a special case of an ensemble of smaller things.

In the physical world, in anything - even inside a single point - there are always infolded vector things in violent motion. We may say that these interior critters are "hyperspatial" or "infolded" or "virtual" or "hidden". But they're real and they're inside the point, as seen by the external observer.

The point is this. Everything seen externally is a plenum internally. In the real physical world, both a thing that's externally motionless (a scalar) and a thing (a vector) that's externally translating through space, are special cases of a system whose internal parts are always in motion. If the sum of the internal motions is zero, the external object seems to be sitting still and motionless to us (though it's still moving through time with - usually - uniform motion). We describe that internal characteristic of the system as a vector zero resultant system. Externally we may also characterize it as a scalar, because it still possesses attributes that have magnitude.

On the other hand, if the sum of the internal motions is not zero, but is a motion in a certain spatial direction, then to us the external object seems to be moving along in space. That is, it is translating spatially. Externally it has both magnitude and direction, so we view it as a vector. To label a thing as only a vector is to look only at its external attributes. To label a thing as only a scalar is to look only at its external attributes. To look at its internal attributes, it must be recognized as a scalar and a vector at the same time. That is, the scalar attributes must be recognized to be composed on internal vectors.

Summing that up, physically a scalar thing is a thing that,

(1) is a vector in time, which is hidden from direct observation

(2) externally is just a magnitude spatially

(3) has an internal spatial vector structure, and therefore a hyperspatial or virtual-state vector structure

A vector is a thing in motion in a dimension (through a frame), whether in space, hyperspace, or time.

Rigorously it is not possible to exclusively separate the notions of vector and scalar, because any scalar, to persist, is automatically a vector in time.

These concepts of vector and scalar are normally not nearly so well clarified in standard physics and mathematics texts, unfortunately. Usually discussions of this type are reserved to obscure papers in foundations of mathematics. It may surprise the casual student, for example, that the notions of line, point, space, zero, length, dimension, frame, time, and observer have no truly acceptable definitions. Neither do the notions of force, mass, field, potential, etc. In fact, mathematics no longer attempts to explain how a line can be made of points. Instead, in foundations, it is simply stated as three postulations thusly, "There is a class of entities called points. There is another class of entities called lines. Lines are composed of points."

From a physics viewpoint, one of the big problems with the present vector mathematics - which is well-known not to be a complete system of mathematics in the first place - is that the presence of a bunch of vectors that sum to zero is just treated as a zero or absence of any vectors at all. That is, the absence of any internal vectors

at all is made synonymous to the presence of a bunch of internal vectors that are fighting each other to a draw. What this does is throw away the internal energy and internal ordered structuring of the medium - specifically, the energy of all the vector fighters that is continually going on inside the local medium - inside spacetime itself. Physically that's quite wrong, and one is throwing away exactly half the energy of the situation.

There is a very real physical difference between a system of real vectors that fight to a draw and so do not translate en masse, and the absence of any vectors and vector-fighting at all. The difference is composed of stress and its internal vector patterns - the internal energetic engines in local spacetime and local rest mass - in short, the energy trapped in the local medium.

Where electrical students meet this hidden problem, of course, is in the fact that the four vector Heaviside equations of EM are not closed. One always has to assume that one or more of the "remaining potentials" is zero - that is, absent. So right there all the texts and professors reduce even Heaviside's equations to a special case of the absence of any "left-over and hanging around" scalar potentials. As an example, that little assumption gets rid of any possibility of the Aharonov-Bohm effect, where potentials alone can interfere, even in the absence of EM force fields, and produce real force effects in charged particle systems. That is, the sole agent of the interference of scalar potentials can induce EM changes, according to the experimentally proven Aharonov-Bohm effect, even in the total absence of EM force fields.

Since 1959, it has been known in quantum mechanics that the EM force fields are not primary agents at all. We know that classical EM theory is completely wrong on this. QM shows that it's the potentials that are primary, not the force fields. In fact, it can be shown that the E-field and B-field do not exist as such in vacuum; only the potential for the E-field and the B-field exist in vacuum. Feynman pointed that out, but nearly all of his modern cohorts seem not to have recognized that fact. Indeed, vacuum is just a conglomerate of potentials, nothing more, nothing less. And if you just look carefully at the definitions of force and E-field, you see immediately that (1) force (nonrelativistic case) consists of mass times acceleration. Therefore a force consists of an accelerated mass. An electric force consists of an accelerated charged mass, normalized for a unit. But it really isn't treated that way in the EM theory, where it continues to erroneously considered to exist as a force field in the vacuum.

At least you've got to use the adjectives "virtual" and "observable" to differentiate vacuum things from material things. One can correctly state that a virtual electric force field exists in vacuum, comprised of accelerating virtual masses, but not an observable force field. The observable electric force field requires, and consists of, accelerated observable charged particles. And the only place observable particles exist are in a physical medium, of a collection of one or more observable particles in space.

So it doesn't take any special powers of thought to directly show that there are some very serious, fundamental things wrong with the present foundations of EM theory. There are lots of other flaws in EM, such as the fall of the Lorentz force law in modern railgun experiments. The law has always been false, but is a sufficient approximation if the energy regime is not too high. Peter Graneau's work is fundamental in this respect.

To sum this up another way. The present vector analysis (as applied to electromagnetics) discards the internal, trapped EM energy of local spacetime. Now if the internal trapped energy of spacetime varies from place to place, that is called a curved spacetime, relativistically speaking. And when a spacetime is curved, there is communication of energy between the internal, infolded, virtual EM energy state and the external, translating, observable EM energy state. Curved one way, the local spacetime is a sink, with external energy pouring into it continually, and disappearing from observation of the external state. Curved the other way, the local spacetime is a source, with energy pouring out of it continually, and appearing in observation in the external state.

What the present vector system of EM does, therefore, is throw out the ability to use the very strong EM force as an agent to curve local spacetime. The very mathematics itself, a priori, assumes and guarantees a locally flat spacetime. And in an uncurved region of spacetime, for example, you are never going to make an over-unity machine - a so-called "free energy" machine that will give you more energy out than you put in - because the application of the vector theory a priori guarantees the elimination of any hidden sources from the local spacetime (ST) medium. If you're going to tap the trapped vacuum energy, and make a so-called "free energy" device, you're going to have to curve the local spacetime.

That is the only way to produce a local energy source in the vacuum, from which a current issues. Notice that, when we put a paddlewheel in a river, we produce a free energy device because we tap some of the energy in the flow. But we tap a current, we do not just tap a potential per se. The entire secret of tapping vacuum energy,

to build a free energy device, is to produce a current in the local vacuum potential that is self-sustained, and then tap that current.

So the present EM theory throws away exactly half of the energetics of the situation involved. From time to time yet another physicist discovers that astonishing fact, and publishes a paper on it to point it out. Nobody does anything about it, however, because no one has the foggiest notion of what to do. So everybody just lets it pass and nothing is changed.

Question2: Can you give us a more concrete example of the missing half of the energy?

A: Yes. Suppose, for example, you connect a voltmeter across a wall circuit to measure the voltage. The meter needle moves against a spring with a force, as a result of the detection made by the voltmeter. The actual detection is an interaction inside the meter's probe which induces conduction electrons to move. We read the needle movement that resulted from those conduction electrons, and we infer so much voltage. The important point is this: The voltmeter is measuring the energetics of its own internal change; it is not at all measuring anything external. All instruments measure only their own internal change. We infer the external thing that interacted with the instrument to cause the internal change.

We do not measure the external entity directly, but only the results of its interaction inside the probe and meter. And even then, we measure only the external, spatial-translation energy of the instrumental interaction; we do not measure or account for the internal energy of that interaction. To state it more precisely: The needle moved because conduction electrons accelerated away from the instrument's interaction area. This current flowed into a coil and produced a force on the needle movement, rotating the needle against a spring. At the same time, another current - a time-reversed, phase-conjugate current - was induced in the atomic nuclei of the atoms in the interaction area.

This "inner current" flowed Whittaker-wise through the atomic nuclei of the instrument, producing an equal and opposite force. [This is the mechanism that produces Newton's third law in the first place, as suspected by Feynman.] So the entire body mass of the meter recoiled slightly from an equal and opposite force, which we just loosely refer to - and recognize as - Newton's reaction force. It's there, it's real, but we completely neglect it in our electrical measurements. Usually we don't think it had anything to do with the external entity that interacted with the voltmeter.

But it was a product of the same interaction of that external "something" within the meter. It's equal and opposite to what generated our electrical measurement. So exactly as much energy was produced in the "reaction force" energetics as was produced in the "external meter needle force" part of the interaction. We only measured and accounted for half the true energy of the interaction, or else you've got to discard Newton's third law.

It follows that what actually entered into the interaction was a system of oppositely paired forces - a stress field, which is a scalar potential. This, of course, is consistent with our observation that vacuum itself is pure potential. As such, it consists of partial potentials of various kinds - it's highly charged, and the ambient vacuum scalar potential has very high magnitude. Remember that this ambient vacuum stress (potential) can be decomposed into sets of bidirectional forces.

In our EM interaction, one-half of the stress pair - the half that is the normal photon-generated EM force was utilized to move the conduction electrons, involving primarily the electron shells of the atoms imbedded in the vacuum potential. The other half of the stress-pair interacted with, and moved, the atomic nucleus, causing it to recoil. The recoil of the nucleus was slight, because it is very, very much heavier than the accelerated outer electron.

To sum it up

All detection is actually binary, it's not singular at all. When we detect photons or EM waves, we normally account for only the externalized translation part of the energetics of the interaction. We miss or neglect the internalized translation part, and we miss or neglect precisely as much internal energy as we account for externally. Again, I'm not the first one to point this out by any means.

Question3: Can you give us a precise summary statement of all this?

A: At the interaction area, a part of the instrument and the external causal agent are coupled together as a compound system. In that area, the mass of the instrument exists as atoms, each of which has an inner part (the nucleus) and an outer part (the electron shells). In the coordinate system centered on that compound system, conservation laws apply. The compressive stress of the interaction reacts internally - i.e., against the atoms with their inner and outer parts. Reaction from the nucleus induces a tensile stress. This tensile stress, in the simplest case, can be decomposed into equal and opposite forces, since stress is merely a set of such equal and opposite forces.

One of the bidirectional interaction forces moves externally out of the atom via the electrons, electromagnetically producing a conduction electron current through the instrument and giving a needle reading. The second bidirectional interaction force moves ever inward, since it is a phase conjugate and reconcentrates inward ("crawfishes") rather than scattering outward. This forms a hidden Whittaker current through the atomic nuclei, producing a recoil on all of them. Precisely as much EM energy went into the inner system as went into the outer system. But we normally only measure and account for the external energy, and ignore the energy in the internal channel.

Question4: Can you give us a reference related to this, for example?

A: I'll give you several of them that bear directly on this. See R. Chen, "Cancellation of internal forces," American Journal of Physics, Vol. 49, No. 4, Apr. 1981, p. 372. Chen gives a discussion of these summation vectors and internal vectors. He points out that the internal forces occur in equal and opposite pairs; in other words, as internal stresses. That's certainly pointing out the internal, bidirectional force structure of a scalar stress - a scalar potential, if we're talking EM stress and EM forces. Note that this internal pattern is exactly what Maxwell's quaternion theory captured and retained, and that the Heaviside and Gibbs vector theory discards. Further, the quaternions captured the internal order of this internal force vector structure as well. Second, in a beautiful article Kidd bluntly states that all our measurement/detection is really binocular. See Richard Kidd et al, "Evolution of the modern photon," American Journal of Physics, Vol. 57, No. 1, Jan. 1989, p. 27-35.

E.T. Whittaker, of course, wrote the definitive engineering methodology of how to do all this with EM waves - how to infold the EM waves into a bidirectional wave structure that produces a standing wave of externally force-field-free scalar potential. The two Whittaker papers are (1) "On the partial differential equations of mathematical physics," Mathematische Annalen, Vol. 57, 1903, p. 333-355; and (2) "On an expression of the electromagnetic field due to electrons by means of two scalar potential functions," Proc. Lond. Math. Soc., Series 2, Vol. 1, 1904, p. 367-372.

Now these hidden internal wave structures exist in all scalar potentials, whether they are electromagnetic or not. For example, Ziolkowski has pointed out what is actually Whittaker's 1903 infolded bidirectional planar waves inside the acoustic scalar wave, in work on acoustic missiles. Acoustic missiles are slugs of very strong sound energy that stay together in a slug as they travel, and strike a target a terrible blow, just as if it were a "missile made of sound energy." [See Richard Ziolkowski, "Localized transmission of wave energy," Proc. SPIE Vol. 1061, Microwave and Particle Beam Sources and Directed Energy Concepts, Jan. 1989, p. 396-397. Ed.]

A Soviet scientist, Ignatovich, has pointed out the same remarkable bidirectional wave structure inside the scalar potential associated with the Schroedinger wave equation itself. [See V.K. Ignatovich, "The remarkable capabilities of recursive relations," American Journal of Physics, Vol. 57, No. 10, Oct. 1989, p. 873-878. Ed.]

And I've pointed out a mechanism by means of which you can make a quantum potential, so that separate things - even widely separated - can interact as if they were all pieces of the same system, and all located together at the same location. Further, I've pointed out that you can deliberately structure that quantum potential with a Whittaker bidirectional wave structure.

Question5: Can you make that last part a little simpler?

A: What that means is that in QM, there's a special kind of potential you can make, that can connect spatially separated things and translate energy between them, in hidden fashion and essentially instantaneously. This "connection at a distance" directly results in action-at-a-distance. I've advanced the mechanism for making one of these quantum potentials, so it is subject to laboratory test. Further, in that artificial quantum potential you make, you can put in a hidden EM wave Whittaker structure - hidden "pipes inside spacetime" itself, so to speak. Then you have established hidden EM-wave-energy channels through spacetime, connecting widely separated entities together.

You can then put energy and specific energy patterns - vacuum engines, if you will - directly through those hidden channels. You can have the hidden energy emerge at a distant point and interact in and on a distant physical system there. This distantly-emerging interaction energy can be positive (disordering, or scattering) or negative (reordering). Transmitting scattering energy, you get distant heating - the production of heat energy at a distance. Transmitting reordering energy, you can extract energy from the distant object or system through those hidden channels, accomplishing distant electrostatic cooling.

The other thing to note is that EM energy transmission through the hidden channel is not limited to the speed of light. The speed of light refers to energy transmission through 3-space, and the internal channel refers to energy transmission around 3-space, or in other words, through hyperspace. And it's testable on the laboratory bench.

Question6: Are you saying that real energy can be transmitted faster than the speed of light?

A: Yes. But hyperspatially. Not through 3-space, but "around" it.

Again, this means that it's possible to produce energetic changes in a distant system at a distant place, without transmitting energy "through space" in the normal sense. You transmit "around" space, so to speak, and directly in time or through a higher dimension, depending on the model you're using to understand this. Further, the speed of the internal EM energy transmission is not limited to the speed of light. Whittaker already specifically pointed this out. Quantum mechanics also predicts instantaneous action-at-a-distance and has essentially proven it experimentally.

Finally, you can specifically Whittaker-engineer this "hyperspatial" transmission, if you will, to do essentially whatever you wish to do in that distant system. It all depends on how far you develop the technology; the basis is there. Hypothetically, you can eventually even develop a kind of teleportation. Whittaker transmission through the internal channel is already "teleportation" of energy, so to speak.

Question7: Does this have anything to do with Sheldrake's morphogenetic field?

A: Yes indeed. Sheldrake's morphogenetic field is pure-and- simply a species quantum potential, created amongst the members of a species. As experiences are met by the individual members, they steadily input infolded EM structures into the "inner" EM channels of that quantum potential. Since any infolded EM wave has its phase conjugate - or time-reversed replica - produced and infolded automatically, a sort of "negative feedback" corrective EM signal pattern for all inputs of the bad external EM stuff exists inside the quantum potential. One can show that, for detrimental changes to the species' members, time reversal provides infolded signals that represent an exact counter to the "overstress of the species," so to speak.

These "corrective antidotes" for the overstressed species, however, are in the virtual state. But as more of the same detrimental changes are experienced over generations, the countering signal structures residing in the species quantum potential will be increased over the same period of time. Gradually the hidden EM structure - which is like jillions of little "vacuum engines" - is changing and internally structuring the Schrodinger potential for that species.

Then one day the internal corrective charge is sufficient to breach the quantum threshold. One could also say that the spacetime potential occupied by the species members is now sufficiently curved and structured to serve as a specific- signal-pattern energetic source for genetic change. Breaching this threshold causes specific new genetic changes to occur in the entire species in a single jump. At that point, the actual genetics of egg fertilization (conception) is altered, and shortly thereafter members of the species start being born with the new change, specifically designed to counter or partially counter the former detrimental aspects in the species overstress. In a dramatic example, that's how a reptilian species can "suddenly" develop light, air-filled bones; feathers; and wings, for example, and change from a reptile to a bird in one single jump. Sheldrake's morphogenetic field is a species quantum potential and the charged-up Whittaker structure is the inducing agent.

Question8: You're saying, then, that living systems use this inner, hidden EM energy channel in addition to the external energy channel that we know in ordinary external electromagnetics?

A: Absolutely. In fact, the distinction between a living system and a nonliving system is precisely the fact that the living system deterministically utilizes the inner EM energy channels inside Whittaker-structured scalar potentials. And those scalar EM potentials are centered on the atomic nuclei of atoms comprising the living system's molecules, cells, tissues, and mass.

Question9: How does that relate to present brain-wave research, and measurements of brain-waves electromagnetically?

A: It says that present research is devoted almost entirely to measuring and pondering the surface waves in the ocean, so to speak. The mind, thoughts, emotions, and real living functioning systems are deeply hidden, underwater waves in that ocean. Science will have to instrument for detection and recording of the hidden interior energetics region, or they will never solve the mind/brain/body problem. And without the interior energetics, they will never understand life, memory, personality, thought, and primary biological control, or human intent.

Question10: You are saying, then, that this hidden internal electromagnetic energy channel is intimately connected with the mind, life, and personality?

A: Absolutely. The mind consists of stabilized Whittaker structures inside the living system's bio-potential. Thoughts are a special class of changes/waves in that overall Whittaker-structure ensemble. The personal unconscious is a single small, localized sample of yet a greater collection that represents even deeper unconsciousness.

The conscious mind is a serial processor - one thing at a time. The unconscious mind is totally conscious, but it is a parallel processor - jillions of things at one and the same time. The serial conscious mind can only make sense of a "single slide in the slide projector" at a time. When it looks at the unconscious mind, it sees a multitude of slides in the slide projector simultaneously - hence it just sees blackness, or nothing recognizable at all.

Jung's collective unconscious, for example, consists of archetypal infolded EM structures acting in common in an overall bio-quantum-potential for the entire species. Gaia, the living earth/biosphere, really does scientifically exist as a common bio-quantum-potential with infolded living EM structures for the entire earth biosphere. The bio- potential in a single body is an overall quantum potential that links and joins all the atoms and cells of the body. The "spirit" of the biosystem, if you will, is its "living biopotential" - its living quantum potential. We already know that a potential is everywhere nonzero all the way out to infinity. So the spirit of the living system is - in the virtual state - everywhere in the universe - and everywhen as well. It's all a giant hologram, not only in space, but in spacetime.

The entire universe is everywhere alive, with everything. Note that if you simply examine the "ghost forms" requirement of quantum mechanics, this conclusion is inescapable. All life is eternal. Nothing is ever lost.

A thought or thoughtform is just a specific, dynamic Whittaker structure in the hidden EM channels of the biopotential. Thoughts and thoughtforms are real. They are virtual spatially, but they occupy one "real" spacetime dimension, time. Physics and metaphysics share one common, nonobservable dimension time. So long as physics continues to have time, which is nonobservable a priori, then it also must contain everything that is a structure or action in time. Skeptics of parapsychology, who believe that humans are robots and the mind is just a meat computer, just have little or no foundations knowledge.

And if you get carried away by the "observable, objective science" bit, remember that the choice of fundamental physical units in physics is arbitrary. You can - and it's actually been done - build all of physics from time as the single fundamental unit. That means that you can build the whole observable, detectable physics model out of the totally unobservable and nondetectable. Quantum mechanics long ago destroyed materialism for all time, but it just hasn't percolated through the prevailing scientific dogma yet.

With Whittaker EM engineering, you can conceivably "make" thoughtforms to order, and input them directly into the mind and longterm memory. If we view the conscious mind as a special serial computer, we have now found where the software is - for mind, longterm memory, and personality. As scalar EM technology develops, we will have direct access to the software, so to speak, for the very first time. And we will be able to engineer it at will.

Question11: But is this good or bad?

A: Actually it's either, or both. We are describing a set of hidden internal EM energy structures, the fundamental mechanism for internal EM structuring, and a tool. A tool is amoral; it has no morality, and is inherently neither good or bad. The intent of the user of the tool, however, may be either good or bad. So the tool can always be used either way, for beneficial purposes or for evil purposes. It's the hand that wields the knife that is moral or immoral; it is not the knife. The same cutting tool can be used by the surgeon to heal, or the murderer to kill. Human intent differentiates amorality into morality and immorality.

Question12: What is the biological impact of the forthcoming new technology that directly accesses and engineers the internal energy regime?

A: It will be both a tremendous blessing and a terrible curse. It's the most powerful tool ever conceived. By engineering the Schroedinger equation, for example, one can theoretically engineer physical change itself. One can actually engineer physical reality, change the laws of nature, and determine if a thing shall even emerge into physical quantum change at all, or if it shall change its physical form. Mind-wise, eventually one will be able to directly input material into the mind - whatever is desired. Education, for example, will simply be achieved by "loading the proper software." Everyone will be enormously educated, by today's standards.

That should for the first time allow the complete alleviation of unemployment due to lack of employable skills, for example. It should be possible to virtually eliminate unemployment and poverty. Any sort of disease whatsoever - physical or mental - will be rapidly curable, simply and cheaply. It will be possible to reverse aging and rejuvenate the person. It will be possible to regrow limbs and straighten misshapen spines - and directly remove the causes of mental diseases and cure them as well. Lifespan will be staggeringly increased, without "old age's debilitation." AIDS, cancer, leukemia, and genetic diseases will be completely conquered. The potential for a true golden era is upon us, for all humanity.

On the other hand, it will also be possible to simply pull out a personality-structure from a person, without his or her consent, and insert another. Or to alter a given personality structure by just altering and re-recording the software. This technological possibility, of course, will certainly be noticed by would-be egomaniacs and dictators, for it can yield the ultimate mind control. It will also be possible to provide direct input inside the mind, surreptitiously, from a distance and without the knowledge and consent of the individual affected.

This can be beneficial if it's just "instantaneous telepathy" - instantaneous communications, so to speak, and if it's desired by the recipient. It can be highly detrimental if it is undesirable material, or if it's a forced internal change, or enslavement, or used to overwhelm and destroy the mind, or used to jam the body's immune system, induce virulent diseases en masse, etc. Unless the present inhumanity of one human for another is overcome, future wars are likely to take on aspects that stagger the imagination. In 1975 Brezhnev called these new mass destruction weapons of the future "...more frightful than the mind of man has ever imagined." He should know. When he made the statement, the Soviets had already been inducing diseases in persons in the U.S. Embassy in Moscow for nearly 30 years.

Question13: Can you explain that part about direct, forced input to the mind, just a bit more?

A: Yes. It involves a characteristic of the mind and brain that has been experimentally shown. For example, if anything (thought, feeling, emotion, image) arises internally in one of the cerebral hemispheres, that hemispheric personality thinks that it did it. That is, it thinks that it not only thought the thought, but that it also created the thought. So if you have a hidden channel to pipe in inputs, you can take over or implant the thoughts, behavior, and actions of a person. Or of a very large group of persons. That alone allows a mind-numbing direct control of behavior externally and from a distance.

Question14: Can you really control behavior electromagnetically? Can you give us an example?

A: Yes, you can control it readily and deeply, if you develop and utilize the internalized EM energy channel technology. As to proof, Delgado certainly has demonstrated profound control over animal behavior experimentally, for all the world to see, using implanted probes and precise injection of EM signals. The Soviet LIDA machine, using a 40 MHz carrier and complex waveforms - and actually the hidden Whittaker-folded EM structuring, unknown to Western technologists - has demonstrated the ability to place a mammal - either a human or a cat - in a cataleptic state. That state can be induced in a few minutes exposure and then persists for some minutes after the stimulus signal is removed. That proves that you can profoundly alter the mental state, electromagnetically.

Perhaps the very best example is provided by the two cerebral hemispheres in your own head, or those in a rat, or those in a cockroach. As we know from split-brain research, each hemisphere has a separate personality. That's a separate being, if you will, to put it bluntly. Yet even though you are two beings in one body, so to speak, you are only conscious of one being. How is that, you might ask, since both brain halves are operating? How do you integrate two beings consciously into one functioning being? Such as is already done in your own head?

The answer is this. Suppose your left brain sends a signal to your right thumb to move. While the signal is on the way to the right thumb, the left brain also sends a replica of the signal over the connecting corpus callosum, into the right brain half, where it emerges inside.

[When the signal emerges inside a brain half/mind/personality, it thinks that it itself originated it. That's because it perceives no time delay between appearance of the signal in its "transmission" section, e.g., and the appearance of the signal in its "receiver" section.] The ultimate definition of identity, after all, is the absence of all distinction. The absence of functional distinction in time constitutes the creation of identity in time. The whole arises when and only when distinction between the parts is lost.]

The right thumb is continually communicating back to the left brain half, telling its progress. Replicas of those return signals from the thumb are continually being sent by the left brain across the corpus callosum into the right brain. The right brain thinks that it originated the thumb-move-order, and that the right thumb is reporting its progress. The right brain thinks it did the whole thing itself. A similar process occurs, of course, from left brain to right brain. Each inputs to the other, at least insofar as awareness of the order and the event is concerned. Each thinks that it did it. In that way, there is a loss of distinction between the parts of the functionality. Accordingly, there is only one sense of being in the bi-system, even though there are two separate beings.

It has also been shown that, when the corpus callosum is severed, the two brain halves now function much

more independently. In that case, two separate personalities really do emerge and function in one body. That also has been shown in the laboratory.

Question15: But aren't you actually saying that the mind and thought, then, are not really just electrical wiggles in the brain after all? That they are actually separate from the physical brain, and the brain is just a special sort of tuner or "workstation"?

A: Exactly. The real functioning of mind, thought, memory, and personality occurs in the infolded Whittaker bidirectional EM wave structures of the overall body's scalar potential - its bio-potential. And one of the great neural scientists has already pointed out that mind and memory are not precise functions of physical location in the brain.

Question16: Is there any real proof of the internal energy channel operation of the mind, or is it just all still a theory or hypothesis?

A: The basis can be shown, and it is directly subject to laboratory test, with a decent laboratory and a little effort. Let me give you a very strong datum point.

There exists a rare, completely bafflingly medical phenomenon - which has until recently been concealed - called hydrancephaly. To the normal materialistic Western biologist, this condition is astonishing, to say the least. In hydrancephaly, a person's cranial cavity is filled almost totally with fluid, not with brain matter. There may be only 5% or so of the brain in there; typically just the small portion on the tip of the spine. The other 95% of the brain case is filled with fluid. Yet the individual may be as normal as you or I. Except, of course, that x-rays of his head will astonish all the doctors. A few years ago, for example, such a hydrancephalic individual graduated from a university in Great Britain, with a degree in mathematics.

British news actually made a video documentary on this subject, and particularly on that individual.

Now obviously hydrancephaly proves rather conclusively that it isn't really the brain matter or the electrical wiggles in the two hemispheres that constitute the mind. Those wiggles normally are correlated with, and communicate back and forth with, the internal Whittaker dynamics of the bio-potential. The brain is a special communications and processing station, interfacing sensors and processed stuff from the external world to the Whittaker-sets, and outputs from the Whittaker-sets to the body and cells. If just a small functioning part of this "way station" remains fully functional, the interfacing still exists.

Question17: Can you shed any light on the functioning of the fluid that fills 95% of the brain cavity of a hydrancephalic?

A: Perhaps a little bit. There's an interesting thing about fluid - about water. The hydrogen bonding structure of water is enormously complex and richly varying. Bond-structuring of water constitutes a special kind of "neo-Whittaker" substructure inside a special kind of potential for that particular body of water. A glass of water, for example, has an overall neo-potential comprised of its hydrogen bond structuring. That water will change its internal bonding structure if you enter the room, or if you blink your eye while observing it. It continually adjusts to everything in its surroundings.

The reason is, everything in its environment has charges, and clumps or orderings or structures of potential. And the internal Whittaker structures of all those potentials overlap because the potentials overlap. Therefore the internal bidirectional Whittaker EM waves intercommute. The internal dynamics of the water receives inputs from the surroundings this way, and the water's bonding structure changes accordingly. We've only known the complexity and richness of this water structuring for less than two decades, and so far as I know, no one else seems to be considering the Whittaker infolded EM wave structure aspects of it.

The point is this. In the fluid inside the head of a functional hydrancephalic, the water structuring is quite sufficient to provide the rest of the needed "way-station two-way tuner, processor, and transmitter-receiver." The reason is quite simple. The potential of the fluid constitutes a partial potential in the overall bio-potential of the body. It's like the pressure of a mixture of gases: the overall pressure consists of the partial pressures of the component gases. The Whittaker structures ensure intermingling and intercommunication through the internal energy channels of the total bio-potential to all its constituents. Therefore the water structuring of the fluid in the head of the hydrancephalic serves - bridgewise - as a substitute brain.

Other supporting evidence, of course, is that quantum mechanics experiments have essentially established action-at-a-distance and quantum correlation.

The quantum potential, therefore, is something real and functional after all.

And even more evidence is provided by the nature of a linear material versus the nature of a nonlinear material. However, that would take a book, and is just too much to cover in this interview. Suffice it to say that a strong argument can be made from the nonlinear characteristics and phenomena themselves, such as production of time-reversed waves, amplification of time-reversed waves, negentropy (re-ordering of scattering energy), etc.

The bottom line is that there's certainly enough evidence to substantially support these hypotheses, and move them from the realm of idle speculation to the realm of "worthy for further experimentation and development." The ultimate proof, of course, will be when one demonstrates the actual production, recording, and functioning of a living mind. With the internal energy approach, that is hypothetically quite possible, and will eventually be lab-demonstrated.

Question18: How is this related to the neurons, synapses, and dendrite firings in the normal human brain?

A: The same "internal electrical structure" thing is true of the brain and its dendrite firings, EM waves, and tiny but extremely numerous currents and fields. Take an instantaneous snapshot of all the dendrite firings - billions of them - frozen for an instant. The actual pattern or structure represents the internal state of the brain's bio-potential at that instant. Take another snapshot a moment later. The change of the internal structuring represents the brain's internal structuring at a new moment. Interfering (subtracting) the two snapshots provides a delta that represents the exact and total change that occurred in the brain-state during that tiny interval between snapshot one and snapshot two.

But since thought itself is a change in internal brain-state, then the thought patterns during that interval must be contained in those changes. And of course a myriad of other brain control actions are in there as well. Commands to beat the heart, direct biochemistry of cells, etc. To detect the internal state precisely, one now needs to decompose that delta pattern into its Whittaker-structure components and sort them all out.

Question19: How would one go about detecting the internal state, to get at the actual thoughts themselves?

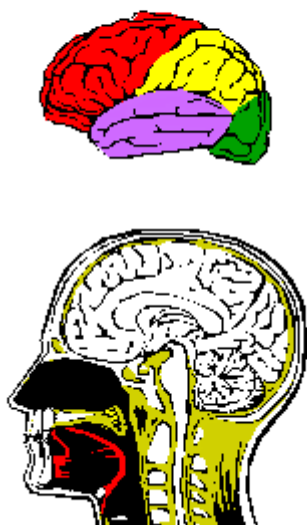
A: Well, one has rather much got involved with the standard chaos problem. You've got hidden order (the thoughts) buried up in a lot of extraneous material. In other words, you're looking at something statistical, and it's got several kinds of hidden order hidden in there in what to you appears to be a whole lot of noise. So you do something very similar to what we described in the snapshot analogy, but apply Whittaker-channel detection at the same time. Actually, a first step in this direction has been beautifully done by Dr. Hunt.

She divided the external brain-wave region into several frequency bands. (Actually, harmonic intervals are best, per Whittaker theory.) She set up individual detectors for all the frequency channels simultaneously. Then she divided each of these channels in two branches: one branch straight through without a time delay, and the other delayed by a bit, say, 6 milliseconds or so. Then she mixed all the delay channels onto all the nondelay channels, and recorded the superposition. And lo and behold, she got beautiful traces of hidden chaos in brain wave activity.

The traces exhibited the standard chaos attractors. Her magnificent work is very strong evidence that the real activity of the mind occurs in hidden variables, in hidden channels inside the normal "envelope/external electromagnetics" represented by normal brain wave measurements. Hunt has shown that there is a hidden, deterministic, dynamic order "inside" the normal statistical EM brain activity.

Over two decades ago, a Russian scientist, S.K. Lisitsyn, obliquely spoke of Russian breakthroughs in this area. Lisitsyn stated that the Soviets had "broken the human brain code." He further stated that some 23 channels were involved, reaching all the way up to optical frequencies. However, only 11 of these frequency channels were independent. He also mentioned that the brain coding did not number over 44 "digits".

Lisitsyn's Report: Brain Code Broken



- ★ THEORY DEVELOPED AND FITTED
- ★ HYSTERESIS MEMORY LOOP
- ★ CONTROLLED EM INDUCTION
 - IMAGES
 - SENSATIONS
 - PREDETERMINED EMERGENCE
- ★ 23 EEG BANDS
 - UP TO 8.1×10^{20} HZ
 - 11 INDEPENDENT CHANNELS

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S.K. Lisitsyn, "New Approach to the Analysis of Electroencephalograms,"
DDC Report AD73005, p.16-25.

Now I interpret his remarks as indicative of direct application of Whittaker theory. Lisitsyn of course did not give the details; that's highly classified in the Soviet Union, as witnessed by the Petukov/Toth incident in Moscow. However, I interpret Lisitsyn as having obliquely referred to 11 independent Whittaker frequencies - the fundamental frequency and 10 harmonics - that are used by the brain workstation to intercommunicate between the mind and the external electrical/physical functioning of the organism. I interpret the remark about 44 digits to probably mean that there are some 44 different independent Whittaker spectrum sets, where each spectrum consists of the fundamental and 10 harmonics. And in each frequency channel of a set, there are two bidirectional EM waves - actually, an EM wave and its time-reversed antiwave (phase conjugate replica).

Question20: Can you tell us something more about detection of standing scalar EM potential waves?

A: For fundamental detection of the scalar wave, you must realize that several kinds of detectors can be utilized. One kind is a spatially-oriented detector, and detects spatial aspects and changes of the scalar wave and its internal substructure. The other kind detects variations in the local rate of flow of time, and then the "finer time wave structure" of that variation. With either type, the problem has two parts. Let's look first at the spatially-oriented detector.

First, one must detect the absolute potential at the point of intersection. Second, in this detected potential, one must detect its internal, infolded EM bidirectional wave structure - in short, its Whittaker structure. An additional requirement, of course, is that the instrument must be shielded against the effects of spurious EM signals in the area. In short, it must be in a Faraday cage. Even more than that, one must be able to vary the grounding potential on the shielding cage. One must be able to let it float, have it at ambient, or move it to some specific value.

A Geiger tube, for example, will usually detect a strong absolute potential. That is, the potential increases the charge on the atoms or molecules of the gas it contains, and at the ionization point, the gas starts to ionize. The counter, of course, then counts the ion discharges, whose rate is correlated to the level of ionization, and hence to the strength of the ionizing agent. Note that Geiger tubes do not necessarily detect nuclear radiation; they detect ionizing radiation, regardless of the type. While nuclear radiation is certainly ionizing radiation, so is strong scalar radiation. Even though the scalar wave is a standing wave, its increased level of potential can ionize the gas in the tube. Of course, if the standing scalar potential wave is a sine wave function of the radial distance from the source, and the Geiger counter is at the node, it will not read because there is no difference there from normal ambient vacuum potential.

Note also that the so-called "microwave radiation" of the U.S. Embassy in Moscow was detected originally with a nuclear radiation detector - probably a Geiger counter. Pure microwaves are non-ionizing, and would not have activated the counter. Shortly I will have a new book out, *Gravitobiology A New Biophysics*, which will explain precisely how the health changes in the Moscow radiation were induced in U.S. Embassy personnel. In the book we will also explain Kaznacheyev's "death photons" and the EM induction of disease at a distance. We'll also explain the mechanism for producing an EM antidote signal for any disease, known or unknown.

The problem with the Geiger counter as detector is that it only accomplishes half the job, even when it works. It doesn't break out and measure the Whittaker bidirectional EM wave structure of the ionizing potential at all.

Here is a possible scheme for a better detecting system. Use two detecting probes, some small distance apart, inside the shield. At each probe point, use a high input resistance, very low voltage detector - microvolts or picovolts range, normally. The signals should then be mixed and another difference frequency detector of similar kind utilized. Under proper circumstances, this produces a normal EM beat frequency (via the Aharonov-Bohm effect). The second stage of the detector can then come into play. The beat frequency is input into a standard spectrum analyzer, which should detect the components of the Whittaker spectrum as modulations on the detected Aharonov-Bohm effect beat frequency.

The disadvantages of this detector are two-fold. One, the actual ground potential at which the shield is biased, affects whether or not you get a detection. Second, it's basically a very short wavelength detector for, say, millimeter waves to waves in the one meter band. That should be good enough for scalar communications research, however, and the Soviets have reported highly significant biological effects of the Lisitsyn kind at about 2.1 millimeter wavelengths.

For longer wavelengths, one has to either have rather widely separated instruments operating in a bistatic reception mode, for the scalar interferometry, or else use delay- materials and schemes in probes. Another way that can be worked out is to use a characteristic of nonlinear materials. If a sine wave is input to a nonlinear material, harmonics are produced. By tailoring and choosing the materials, one should get appreciable frequency shifting up the scale via harmonic production.

Another way is to realize that a standing scalar potential wave can also be considered as a standing wave in the rate of passage of time. So the presence of a scalar potential alters the local rate of time passage.

But since it alters time flow, it affects everything else that locally exists in time - and that's everything. More exactly, there is a stress effect on the rate of flow of time. And there are certain detectable functions that occur in detectors and solid state components, for example, that occur because of the time stream stress changes. I cannot be more specific, because the effects I know about here were discovered by John Schnurer and are proprietary to him. But John can build a detector based on this effect, at least for the overall potential. It remains to develop detection of the EM substructure and its spectrum, and he will have a very good scalar EM system detector.

Other things very useful in developing detectors have been reported by Hunt, Bedini, Beck, Howonadec, Golden, and others. Golden particularly has a very good scalar communications detector, and several good scalar communications transmitters. One of his typical detector systems, for example, will perform between 20 and 30 dB better for a given power transmitted than will a normal communication system with high gain antennas. And, since the detection of scalar involves unfolding the inner energy spectrum of the Whittaker structure, a direction finder cannot get a direction fix on the signal transmitted via the scalar system.

Beck has certainly demonstrated an extremely sensitive coil of ultrafine wire, that can often outperform the finest

superconductive quantum interference detector (SQUID). The use of extremely fine wire - and lots of overlaying coils - drastically reduces or blocks the radial movement of electrons in any one point in the wire in the coil. Since that's the way electron current actually moves - the movement down the wire is due to drift velocity, and certainly is not the signal - Beck's coil effectively prevents most of the "external electron bleedoff" from the stabilized scalar potential. Thus he's able to block most of the external electromagnetics, and thereby retain the inner part as well. Precisely, his coil is now using gravitons, not photons, to a significant degree.

So the coil as the interaction area of an instrument is able to hold and pass some of the internalized EM energy that normally escapes into and through the nucleus only. At the output of the coil, Beck gets EM from this internal component that the SQUID doesn't see because it doesn't do the escape-blocking in its interaction area.

There are other detector schemes, of course, such as holographic interferometry, but this should give you an idea of some of the things that have to be done to perform good laboratory measurement of scalar electromagnetics.

Question21: Could you return to your discussion of what's wrong with present electromagnetics, quantum mechanics, and general relativity? Perhaps you could address them in order.

A: Okay. I've already stated the case for electromagnetics. Half of it - the really interesting part, the internal energetics - was discarded by Heaviside and Gibbs. By discarding the scalar component of the quaternion, they threw out the internalized EM energy of local spacetime and its communication with distant spatial points. Since the localized energy density of spacetime is essentially synonymous with gravitational potential, they threw out the ability to turn EM force field energy into gravitational potential energy.

They threw out the interaction and entanglement of EM and gravitation, and wrote the special subset of Maxwell's theory that is restricted to the case where gravity and electromagnetics do not interact. As a subset, their work is perfectly okay. However, a priori you will never use their approach - nor the applied technology that follows its principles - to produce electrogravitation, over-unity machines, tapping of vacuum energy sources, etc. You will never electrically change the inertia of a body at rest, structure the electric and magnetic flux itself, or achieve and utilize action at a distance. And your instruments developed in accord with the Heaviside/Gibbs EM principles will never detect or measure the mind, thought, and emotion - for those instruments a priori discard and ignore the internal energy arena where mind, thought, and emotion reside and function.

And since the externalized EM energy is scattering energy, energy once scattered will produce entropy - increased disorder, and only the positive flow of time. And that science and technology will never be able to translate EM energy into G-energy and vice versa. Every system built under its principles will be at extreme best a "break-even" system. It will never produce more energy out than is input in. It is at best a diode engineering technology.

Question22: What about present quantum mechanics?

A: Quantum mechanics has a severe foundations problem the missing chaos, or in other words, the problem of the missing hidden order. Let me explain how that came about. When physicists were constructing quantum mechanics, it was of necessity a statistical theory. They simply lifted the Gibbs thermodynamics statistics, and utilized it as the quantum statistics. Furthermore, Gibbs statistics was based on the theory of the random variable; that is, the variables were considered random. So, because random variable statistics were utilized, the QM postulate that "quantum change is statistical" was over-restricted to the special case of "quantum change not only is statistical, but also is random."

The second case, "quantum change is statistical, but can contain hidden order and be nonrandom," was thus excluded a priori, simply because of the statistics utilized. Now the random change hypothesis is easily falsified, as follows If you collect large numbers of random change, the resulting collection is still random. The next collection will not necessarily produce the same collection at all. (In fact, if it does, then this is prima facie evidence that the variables are not all random.)

What this means is that, if quantum change is random, then collections of these random tiny changes could never integrate to provide us the ordered macroscopic universe we live in and observe. You couldn't have a flower, or a tree, or anything, for that matter - just total randomness. Obviously that is not true, or else you and I do not exist and this macroworld does not exist.

For integration of the statistical quantum changes to yield an ordered macroscopic universe, quantum change must contain hidden order. That is, the variables must be chaotic, not random. If the changes are chaotic, then integration of them will see large scale forms emerge and stabilize - which is what we actually observe in physical reality.

So ironically, the biggest foundations problem in quantum mechanics today is the problem of the missing chaos! Try as they will, quantum physicists cannot find the missing hidden order, because they continue to use the Gibbs statistics that already excludes it. So they now know that somehow QM is wrong, and many of them fear that this most successful of physics theories will have to be completely redone.

David Bohm, of course, long ago pointed out that hidden variables could contain the hidden order. Actually all of experimental physics is consistent with his hidden variable theory (HVT). Mainline QM theoreticians, however, shun hidden variables (and therefore hidden order). They avoid hidden variable theory by applying a kind of Occam's razor. They say that Bohm's HVT seemingly predicts no new phenomena, so why adopt it at all, or even seriously investigate it? And since Bohm did not know how to actually engineer his hidden variables, nothing could be found experimentally with it that could not also be explained by the present QM.

Now this is where Whittaker's work - and Maxwell's original quaternion theory of EM - saves the day and decisively decides the issue. Whittaker's hidden variable theory is directly engineerable on the lab bench. It's testable, and when applied to quantum mechanics, it predicts hordes of new phenomena and effects, so it certainly gets by the old "Occam's razor" saw. When you apply Whittaker's approach to QM, again you provide testable internal EM bidirectional wave structures to the scalar potential, including the Schroedinger potential. Whittaker's work allows direct engineering of quantum change itself, and constitutes testable hidden order inside the "Gibbs statistics." In other words, application of the Whittaker work to QM produces a superset of QM, where the missing chaos is restored.

The postulate that "quantum change is statistical" now has three special cases, theoretically

- (1) the case where no internal order is present, and quantum change is random
 - (2) the case where some internal order, but not total, is present, and quantum change is already chaotic
 - (3) the case where quantum change is perfectly engineered and hence perfectly ordered and deterministic
- Notice that, by adding the hidden order and the internalized EM energy, we've now extended both QM and EM, and unified the two on a common subset each's Whittaker-applied subset, which is the same subset shared by the two.

Question23: So how about general relativity? How does it fit in?

A: A similar thing also happened to general relativity, believe it or not! Einstein unwittingly restricted general relativity to a subset of the theory he intended to write. This over-restriction was again an indirect result of the fundamental Heaviside/Gibbs error in electromagnetics.

Unfortunately, Einstein's view of electromagnetics approximated the classical view. In classical EM theory, EM and gravitation were mutually exclusive. That is, the strong EM force was not usable as an agent to curve spacetime.

Therefore, as a curvature agent, Einstein only considered the weak gravitational force due to the attraction of mass. Now the G-force is far, far weaker than the E-force. For two electrons, for example, the attractive G-force between them is on the order of only 10^{-42} times as strong as the electrical repulsion. The G-force is very, very weak! If only the weak G-force is considered for curving spacetime, then there will never be an observable spacetime curvature, except in the immediate vicinity of a very large mass - such as on the surface of the sun or a star.

Einstein reasoned that the laboratory, and the observer/scientist and instrument, would never be on the surface

of the sun or of a star. Therefore, he reasoned, the local spacetime -- where the lab, the observer, and the instruments are -- would never be curved. The local spacetime would always be flat.

Unfortunately, Einstein then made a fundamental error. He overgeneralized his thought examination. He stated one of his fundamental postulates of general relativity as "The local spacetime is always flat." This is overly restrictive, and did not follow from his thought process. His postulate can be more accurately stated as follows, "The local spacetime is always flat, whenever only the weak gravitational force is used for the agent of curvature and the local region of interest is not near a large collection of mass."

Notice the difference in the two statements of the postulate. Einstein's overstatement does not allow the far stronger EM force to be used for curvature. In effect, his own overstatement excluded electromagnetics from curvature unity with gravitation, in his own general relativity theory. Ironically Einstein then tried for the rest of his life to fit electromagnetics back in there - never realizing that his own too-strenuous statement of the flat local spacetime postulate doomed all his efforts to failure.

On the other hand, the corrected statement of his postulate admits the following corollary,

"When a very strong force such as the electromagnetic force is used for the agent of curvature, the local spacetime may be curved, even though the local region of interest is not near a large collection of mass."

As can be seen, Einstein unwittingly wrote only a subset of his intended theory. Correct restatement of his overstated postulate of uncurved spacetime dramatically extends general relativity, and unites it with electromagnetics in a unified field theory.

Einstein's error also excluded the present general relativity from ever being a laboratory experimental science. If no detectable spacetime curvature is available locally, it obviously can't be measured in the lab. The vanishingly small local curvature waves following from mass-attraction gravitation are still predicted to be several orders of magnitude below the ability of the finest available detector. And that detector is a huge, monstrous, very costly thing. A priori, if the observer's local spacetime is always flat, there is no local experiment or local apparatus that involves or yields a curved local spacetime!

Unfortunately, Einstein's modern followers have raised Einsteinian general relativity to a dogma. They ruthlessly uphold the overstatement of the flat local spacetime postulate. Physicists who would dispute it - and quite a few would do so - are essentially barred from obtaining funding. If they persist with their heresy, their scientific stature is lost, and they are ostracized and cut off economically. Simply read Santilli's book, if you wish a clear inside picture. Contrary to the scientific propaganda, orthodox science is ruthless in defending its doctrine against all would-be heretics. Much of science has been converted to a religion, instead of a science.

Any person knowledgeable of scientific history can cite numerous examples of scientific suppression, character assassination, and essentially banishment.

- Gauss's nonlinear geometry
- Wegener's continental drift
- Mayer's discovery of the conservation of energy
- Ovshinsky's amorphous semiconductors
- physical therapy
- the EKG (electrocardiogram)
- the clinical use of hypnosis come readily to mind...

Scientists form a distribution, just like any other group.

Some of them are saints. Some of them are devils. The broad majority is neither, but is made up of just ordinary people like you and me, doing a specialized job. Every scientific model is known to be falsifiable and imperfect in the first place, if you believe Godel's theorem. Scientific method does not yield total truth anyway, by its own assertion; at best it yields a partial truth. By the Heisenberg uncertainty principle, every measurement distorts the entity with which the instrument interacts, changing what actually appears to be measured. Real scientists know that scientific models are progressive. For any model, sooner or later a better one, an improvement, will be found.

At any rate, when one looks at Maxwell's quaternion theory, the scalar component captured the ability to enfold and utilize the strong electromagnetic force to make a trapped potential filled with a structure of dynamic EM vector energy. However, if the translation components of the quaternion were zeroed, the system of trapped spatiotemporal energy did not translate spatially, but only temporally. That, of course, is a scalar EM potential without an external force-field gradient. Since it is really trapped energy that gravitationally attracts other trapped energy, then all potentials are gravitational - as is well-known.

In fact, in 1968 Sakharov pointed out that gravitational field is not actually a primary field of nature. Instead, it's always a conglomerate produced from other fields. If his hypothesis is true, then to the first order gravity should be composed of electromagnetics, since it's the strongest force we normally will be able to meet or utilize.

Maxwell's quaternions and Whittaker's profound two papers directly show that. They also show how to engineer all this on the laboratory bench. So the Whittaker scalar EM approach is testable, which meets the major criterion for the difference between a hypothesis and a theory. Any decent university physics and/or electromagnetics staff who put their minds to it can test the approach.

Question24: Are there other physicists or scientists to whom we should also give credit for these things?

A: Yes. I'd like to mention that Nikola Tesla experimentally discovered the standing scalar EM potential wave on the night of July 3-4, 1899, in his Colorado Springs laboratory. He found it being radiated from a traveling thunderstorm. He recognized it as an "electromagnetic sound wave". This was four years before, unknown to the world, Whittaker wrote and published the precise theory for that same electrogravitational wave. Tesla always stated that, in the remarkable systems he later referred to, he was not using Hertzian waves. Rather, he pointed out, he was using EM sound waves - which must be modeled longitudinally. Today we know Tesla was correct - and all his detractors were wrong.

I'd also like to point out the patents and work of Hooper. Hooper seems to be the only physicist who ever methodically investigated EM stresses, structuring of those stresses, and the gravitational implications of those stresses in the laboratory.

I'd like to also point out Sakharov, and honor him for his clear statement that gravitation is not primary, but is a conglomerated field made from other fields. One should also point out the explosive progress made in stochastic electrodynamics as a result of Sakharov's suggestion, by Hal Puthoff and others. And one should definitely honor scientists such as Peter Graneau, who have struggled to point out the foundations problems of electromagnetics and experimentally back up their findings.

And finally I'd like to mention that I've been privileged to work with some extraordinary inventors. In deference to their requests, I will not give a straightforward list of them at this time. But a great deal of any insight I may have gained is in large part due to painstaking, maddening, persistent experiments they have done in the thousands. We will have more to say - and powerfully - about their actual contributions at a later date, hopefully later this year. Lots of other brilliant inventors - Moray and Sweet come readily to mind - have also struggled in this field and produced astonishing and unrewarded results.

Question25: Can you spell out again what effect excluding the internal EM energy had on physics, as simply as possible, and how that is related to vectors?

A: The thing that casting out the internal order and internal structure of the local ST does, is to remove any consideration of hidden, deterministic variables that could be manipulated to create and control quantum change itself.

As can be seen, then, in the physical world scalar quantities are very often really zero vector systems, where the "scalar" or motionless system is actually filled with hosts of smaller "vector" things in violent motion. We have to be very careful, therefore, when we apply mathematics (which does not decompose fundamental scalars into vectors, or identify them as vector zeros) to a physical situation. To use an extreme example, two elephants pushing strongly head-on against each other may produce a "two-elephant" system of opposing forces (vectors), where the system is stationary.

The system is thus a zero resultant vector system, whose motion is represented by a vector zero. The same would be true for two fleas pushing against each other and not moving as a system; the system would be a zero resultant vector system, whose motion is represented by a vector zero.

And here's where the mathematics betrays us, if accepted unquestioningly. In vector analysis, all vector zeros are identical. Here we are saying that the translatory motions of the flea system and the elephant system are the

same. That's true, but there's a whale of a lot of difference in the two systems that must be accounted for physically! If you don't believe that, put yourself in between the two pushing elephants, and see if that's the same as being between the two pushing fleas! You'll certainly notice a lot more stress on you from the elephants than from the fleas.

That illustrates a fundamental problem with vector analysis. In the concepts of the math itself, one conceives a "vector space" as a sort of "place where one can put vectors." Further, no matter how many vectors we put in there, or how they interact, the vector space itself is never under any stress. In other words, in that space, elephant-pushing and flea-pushing are identically the same. And that's the problem. When vector analysis is applied to physical situations, imbedded inside the mathematics of vector analysis itself is the absolute discarding of the stress of local space or spacetime, resulting from the interaction of vectors representing interacting motional physical quantities.

Now in quaternions, that is not the case. Quaternions that interact capture this "local stress of spacetime" and "locally trapped energy of spacetime" in the scalar component, inside it. When the motional parts of interacting quaternions produce a motionless or translationless state for the interacting parts as a system, the stress, energy, and exact geometric patterning of the interactants that are now locally trapped in spacetime is gathered in and accounted for. The motional aspect may go to zero, but the scalar aspect will capture not only magnitude but internal motion and the exact dynamic structure of that internal motion.

Quaternions already incorporate a beautiful hidden variable theory, analogous to Bohm's beautiful work. They incorporate two channels the external energy channel (which is addressed, for example, by classical Heaviside/Gibbs EM theory), and also a hidden internal energy channel (which is not addressed by Heaviside/Gibbs). Quaternions also incorporate hyperspatial aspects, since they are an extension to complex number theory. Notice that Heaviside had to stick back in complex numbers, to get his spatial vectors to unite magnetism and electricity. So he essentially added one extra dimension, typified by the first hypernumber, the square root of minus one. Quaternions already had that in there, and a lot more that Heaviside threw out.

Question26: Would you sum up how general relativity, electromagnetics, and quantum mechanics are unified by the Whittaker approach?

A: Yes. Applying Whittaker's work to each of the three, a superset of it is produced. The new superset has two subsets the present discipline and the extension containing internal EM energy and hidden variable theory. Since all three extensions are actually the same thing, then all three supersets superpose on the common extension set.

Each of the present three disciplines is revealed to be a special case, which unfortunately omitted the unifying extension set. It's like a topless cardboard box that you've cut the bottom out and outfolded the sides separately. To be joined, those separate sides need the bottom of the box. Whittaker provides the bottom. And it's testable.

Question27: Are there any other fundamental things from all this that you'd like to point out, that you haven't mentioned, that follow from the eventual development of this new physics?

A: Several. Please notice that Whittaker's work and the characteristics of Maxwell's scalar component of the quaternion allow the direct electromagnetic engineering of the vacuum. In fact, they allow the actually structuring and variation of massless electric charge flux itself. Now, in the new approach, one electron can be quite different from another, because its electric charge flux can be varied and patterned. Not only can its overall electrical charge be varied, but its charge can be dynamically structured. Now the charge of an electron or other fundamental particle can vary, and the charge flux of a single particle (or a group) can be spatially structured - or activated.

The activation concept, for example, allows an immediate and testable explanation of the mechanism by means of which homeopathy works. Recall what I said about water structuring and hydrancephaly. A chemical compound has a deterministic infolded EM Whittaker structure. If you make a solution of the compound, you change this hidden internal energy structure of the fluid. If you then get rid of the physical carrier - the mass of the original compound - and just leave the inner energy structure for that compound, you have homeopathy.

Chemistry is totally due to charge and charge distribution. In homeopathy you're retaining the charge template in the potential, and that affects charges in the treated body just like the actual medication. In fact better, because you now do not have the "physical residue" to worry with, but do things directly. These new concepts are profound and controversial changes to the present foundations assumptions of physics and biology.

In the new approach, you can't just automatically apply random variable statistics. You have to apply chaos. In structuring the vacuum's virtual photon exchange with the mass of a charged particle, we have moved to a completely new and much more fundamental level of engineering. Now the massless virtual particle charge flux can be activated with a particular dynamic structure - a vacuum engine, if you will - to perform a special job. Or we can activate a local spacetime itself, curving it and internally structuring that curvature to our will.

That locally curved spacetime then becomes a continuing, inexhaustible source of a specialized vacuum engine or engines. We can tailor the local vacuum so as to be able to violate any and all of the present conservation laws, not just two out of three as the present CPT theorem permits. Literally we can use the vacuum's incredibly powerful flux to produce localized vacuum engines. We can reach directly into the atomic nuclei with magic, gentle, accurately controlled fingers.

We can for the first time begin to do actual tailoring and engineering of the nucleus itself. We can further directly collect and integrate virtual state energy forms, which in QM are called "ghost forms." Literally, eventually anything at all can be materialized and brought into physical reality, or dematerialized so as to disappear from physical reality. And we shall be able to engineer and change the local laws of nature, since we can directly engineer and control the Schroedinger equation, the quantum potentials, and the entire local vacuum potential in all its partial potential parts.

Whether we're ready or not, God has now seen fit to hand to humankind the ability to engineer its own physical reality and its own destiny. We can make of the new engineered reality a heaven or a hell. Whichever we do, we will reap the benefits or face the consequences. It would indeed be wonderful if, for the first time, we could develop this powerful new tool to save humankind rather than destroy it.

The Tesla Howitzer

Before the turn of the century, Nikola Tesla had discovered and was utilizing a new type of electric wave.

Tesla repeatedly stated his waves were non-Hertzian, and his wireless transmissions did not fall off as the square of the distance. His discovery was apparently so fundamental (and his intent to provide free energy to all humankind was so clear) that it was responsible for the withdrawal of his financial backing, his deliberate isolation, and the gradual removal of his name from the history books.

By 1914 or so, Tesla had been successfully isolated and was already nearly a "nonperson." Thereafter Tesla lived in nearly total seclusion, occasionally surfacing (at his annual birthday party for members of the press) to announce the discovery of an enormous new source of free energy, the perfection of wireless transmission of energy without losses, fireball weapons to destroy whole armies and thousands of airplanes at hundreds of miles distance, and a weapon (the "Tesla Shield," I've dubbed it) that could provide an impenetrable defense and thus render war obsolete.

In my pursuit of Tesla's secret, it gradually became apparent to me that present orthodox electromagnetic theory is seriously flawed in some fundamental respects. One of these is in the definition and use of THETA, the scalar electrostatic potential. It is this error which has hidden the long-sought Unified Field Theory from the theorists.

In the theory of the scalar electrostatic potential (SEP), the idea is introduced of work accomplished on a charge

brought in from a distance against the scalar field. The SEP is not a vector field, but is a scalar field. Indeed, scalar potential cannot of itself perform work on a charged mass due to the extremely high SEP of the vacuum itself. Only a differential of SEP between two spatial points can produce force or accomplish work. (Rigorously, a differential of scalar potential between two spatial points constitutes a vector. Only a vector can produce force and do work.)

Also, work can only be done on a mass. Further, it takes TIME to move an electron or other charged mass between two spatial points, and so the work performed by a spatial differential of the THETA-FIELD requires TIME. Rigorously, the delta SEP is voltage, not SEP per se, and is directly related to the voltage or "E" field. The entire voltage concept depends on the work performed in moving a mass, after that mass has moved. The idea of "voltage" always implies the existence of a steady differential of THETA between two spatial points for a finite length of time, and it also involves the assumption of a flow of actual mass having occurred. SEP, on the one hand, is always a single-point function; on the other hand, difference in potential (i.e., V) is always a two point function, as is any vector.

Yet many graduate level physics and electromagnetics papers and texts erroneously confuse THETA and V in the static case! Such an interpretation is of course quite incorrect.

Another common assumption in present EM theory -- that the electrostatic potential (0,0) of the normal vacuum is zero --has no legitimate basis. In fact, we know (0,0) is nonzero because the vacuum is filled with enormous amounts of fluctuating virtual state activity, including incredible charge fluctuations. And by virtue of its point definition, (0,0) must be the "instantaneous stress" on spacetime itself, and a measure of the intensity of the virtual state flux through a 4- dimensional spacetime point.

Potential theory was largely developed in the 1800's before the theory of relativity. Time flowrate was then regarded as immutable. Accordingly, electrostatic "intensity" was chosen as "spatial intensity," with the connotation of "spatial flux density." This assumes a constant, immutable rate of flow of time, which need not be true at all if we believe relativity. Such a spatial "point" intensity is actually a "line" in 4- space, and not a 4- dimensional "point" at all. Thus the spatial potential -- 0, 3 -- is a very special case of the real spacetime potential --0,4, or charge -- and electromagnetic theory today is accordingly a special case of the real 4-space electromagnetism that actually exists! Note also that charge is a 4- dimensional concept.

Now mass is a spatial, 3-dimensional concept. Rigorously, mass does not exist in time -- masstime exists in time. Mass and charge are thus of differing dimensionalities!

Also, according to quantum mechanics, the charge of a particle -- e.g., of an electron -- is due to the continual flux of virtual particles given off and absorbed by the observable particle of mass. Thus charge also is conceptually a measure of the virtual flux density, and directly related to THETA. Further, since the charge exists in time, it is the charge of a particle of spatial mass that gives it the property of masstime, or existing in time.

Here a great confusion and fundamental error has been thrown into the present EM theory by the equating of "charge" and "charged mass." As we have seen, the two things are really very different indeed.

To speak of a spatial "amount" of charge erroneously limits the basic EM theory to a fixed time flowrate condition (which of course it was considered to be, prior to Einstein's development of relativity). Thus when the limited present theory encounters a "relativistic" case (where the time flowrate changes), all sorts of extraordinary corrections must be introduced. The real problem, of course, is with the fundamental definitions of electrostatic potential and charge. The spatial "amount" of charge (i.e., the coulomb), as we presently erroneously use the term, is actually the spatial amount of observable "charged mass." To correct the theory, one must introduce the true 4- space SEP and separate the definitions of charge and charged mass.

Only when a mass is moved does one have work -- and voltage or vector fields. (The reason one has voltage and E field connected to a normal electrostatically charged object in the laboratory is because an excess of charged-particle masses are assembled on the object, and these masses are in violent motion! A true static charge would have no E field at all.)

The THETA field need not involve observable mass accumulation, but only charge (virtual flowrate intensity) accumulation. Accumulated masses are like so many gallons of water; accumulated charge is like so much pressure on both the water (space) and the time in which the water is existing.

Now, if one varies the SEP solely as a point function, one would have a purely scalar complex longitudinal wave, and not a vector wave at all. This is the fundamentally new electrical wave that Tesla discovered in 1899.

Rigorously, all vector fields are two-point functions and thus decomposable into two scalar fields, as Whittaker showed in 1903. It follows that any vector wave can be decomposed into two scalar waves. By implication, therefore, a normal transverse EM vector wave, e.g., must simply be two coupled scalar (Tesla) waves -- and these scalars independently would be longitudinal if uncoupled. An ordinary transverse EM vector wave is thus two pair-coupled Tesla scalar longitudinal waves, and only a single special case of the much more fundamental electromagnetics discovered by Nikola Tesla.

A Tesla (scalar potential) wave -- i.e., a massless wave in pure 0,0, the stress of the spacetime medium -- would have very strange characteristics indeed. For one thing, since it moves in a complex 4-space, it has many more modes of movement than does a simple wave in 3-space. And for another thing, it need not be bound at all by the speed of (vector) light. In current theory, one 0,3-field does not directly interact or couple with other existing 0,3-fields except by simple superposition. Therefore presently the THETA- field is considered to have no drag limitation at all, hence infinite velocity. (E.g., as stated in Jackson's, (Classical Electrodynamics, 2nd edition, page 223.)

Actually, a 0,4-wave can and will interact with some of the other existing 0,4-waves in the medium transversed, and this interaction can involve pair-coupling into EM vector fields and waves, an interaction not presently in the electrodynamics theory. The result of scalar pair-coupling creates a finite amount of vector "drag" on the 0,4-wave, so it then has less than infinite velocity. However, if this drag is small due to limited pair coupling, the scalar wave's velocity through the slightly dragging medium still may be far greater than the speed of vector EM waves (light) in vacuum. On the other hand, if the pair-coupling is made severe, the THETA-wave may move at a speed considerably below the speed of vector light waves in vacuum. The velocity of the 0,4-wave is thus both variable and controllable or adjustable (e.g., simply by varying its initial amplitude which through a given medium changes the percentage of pair-coupling and hence the degree of drag on the scalar wave.) The Tesla scalar wave thus can have either subluminal or superluminal velocity, in contradiction to present theory.

Note that the scalar wave also violates one of Einstein's fundamental postulates -- for the speed of our "new kind of light" wave is not limited to c , and need not be the same to every observer. Thus Tesla scalar waves lead to a new "super-relativity" of which the present Einstein relativity is only a highly special case!

But let us now look for some subtle but real examples of scalar waves and scalar pair-coupling in nature. As is well known, a tectonic fault zone can provide anomalous lights, sounds, etc from stresses, piezoelectrical activity, and telluric currents in the earth and through the fault zone. In examining the fault zone phenomena, I finally realized that a fault zone was literally a scalar interferometer --i.e., if one can have scalar PHI-waves, they can interfere either constructively or destructively. Their interference, however, produces scalar pair-coupling into vector EM waves. This coupling may be at a distance from the interferometer itself, and thus the interferometer can produce energy directly at a distance, without vector transmission through the intervening space. Coupling of THETA waves with the paired scalars comprising ordinary EM vector waves can also occur. If this triplex coupling forms additional EM vector waves 180 degrees out of phase, the ordinary EM wave is diminished or extinguished. If the scalar triplex coupling occurs so as to create vector EM waves, the amplitude of the ordinary vector wave is increased.

Scalar potential waves can thus augment or diminish, or create or destroy, ordinary EM waves at a distance by pair-coupling interference under appropriate conditions, and this is in consonance with the implications of Whittaker's fundamental 1903 work.

An earthquake fault zone is such a scalar interferometer. Stresses and charge pileups exist in the plates on each side adjacent to the fault, with stress relief existing in the middle in the fault fracture itself. Since the rock is locally nonlinear, the mechanical stresses and electrical currents in it are also locally nonlinear. This results in the generation of multiple frequencies of THETA-4-waves from each side of the fault interferometer, yielding two complex Fourier expansion patterns of scalar potential waves. On occasion these two Fourier-transformed scalar wave patterns couple at a distance to produce stable ordinary electromagnetic fields in a 3- dimensional spatial pattern --e.g., a stress light such as the Vestigia light covered in Part I of The Excalibur Briefing. Driven by the erratic two scalar Fourier expansion patterns of the scalar interferometer (whose input stresses normally slowly change), an erratic, darting, hovering "spooklight" of the variety studied by Vestigia produced.

As the stresses change in each side of the interferometer, the distant scalar coupling zone is affected. Thus the stresslight moves and its form changes, but it may be relatively stable in form for seconds or minutes. Since the stresses in the rock may be intense, the stress light may involve an intense pair or THETA-patterns coupling into the sphere or ball of vector EM energy. The atoms and molecules of the air in the region of the coupled stresslight ball thus become highly excited, giving off radiant energy as the excited states decay.

Since much of the piezoelectric material in the stressed rocks is quartz, the features of quartz are of particular interest. Each little quartz is itself highly stressed, and has stress cracks. It is therefore a little scalar interferometer. Further, quartz is transparent to infrared and ultraviolet; and the random orientation of all the quartz scalar interferometers may also form a Prigogine system far from thermodynamic equilibrium. If so, this system can tap into highly energetic microscopic electromagnetic fluctuations to produce large-scale, ordered, relatively stable patterns of electromagnetic energy at a distance.

In short, all of this lends support to the formation of relatively stable but somewhat erratic patterns of electromagnetic energy at a distance from the fault itself. In the atmosphere, such scalar interferometers could form in clouds or even in the air or between clouds and earth. If so, such rare but occasional "weather" scalar interferometers could account for the rare phenomenon of ball lightning. The intense energy of the ball lightning, as compared to the lesser energy of an earth stress light, could well be due to the enormous electrical charges between clouds or between cloud and earth, available to fuel the scalar interferometer. Very probably it is this phenomenon which gave Tesla the clue to scalar wave interferometry.

Thus such phenomena as earth stress lights, ball lightning, and the Tesla system of wireless transmission of energy at a distance with negligible losses and at speeds exceeding the speed of light may be explained. They are complex, however, and involve fundamental changes to present electromagnetic theory. These changes include utilizing 4-space scalar electrostatic potentials, scalar waves, pair coupling, ordinary 3-dimensional Fourier expansion, the Prigogine effect, and the properties of piezoelectric materials in rocks.

Since the scalar potential also stresses time, it can change the rate of flow of time itself. Thus it affects anything which exists in time -- including the mind, both of the individual and at various levels of unconsciousness. Therefore the same functions that result in earth stress lights also affect mind and thought, and are in turn affected by mind and thought. This is the missing ingredient in Persinger's theory that UFO's are correlated with, and a result of, fault zones and earth stresses. While Persinger seems to feel this is a "normal physics" explanation, it indeed involves a paranormal explanation.

The time-stressing ability of the true THETA scalar wave also explains the interaction of such earth stress lights with humans and human intent, as noted by other researchers. (E.g., the lights that repeatedly seemed to react to the observers, as detailed by Dr. Harley Rutledge in his epoch-making Project Identification, Prentice-Hall, 1981.)

These ideas in condensed form comprise the concepts required to violate the speed of light and produce an ordinary electromagnetic field at a distance, using scalar interferometry, without losses -- as Tesla had done in his wireless transmission system which he had tested prior to 1900 and had perfected by the 1930's. Scalar interferometry can give stable regions of EM or "light energy" at a distance without losses, particularly as detailed in the beautiful Vestigia experiments, and it is within our grasp to utilize the new effects. Indeed, any stress crack in a material can result in the scalar potential interferometer effect. Exophoton and exoelectron emission -- poorly understood but already known in fatiguing of materials -- must be at least partly due to the scalar interferometer effect.

However, one additional caution should be advanced. Normal movement of electrons allows so much "sideplay" movement of the electrons -- and there is so much such sideplay electron motion in the surrounding vicinity -- that pair coupling is almost instantaneous for small waves. Thus orbital electrons in atoms seem to absorb and emit vector EM photons. Actually they also emit some percentage of scalar waves as well. Since a scalar wave is comprised exclusively of disturbance in the virtual state, it need not obey the conservation of energy law. Further, a scalar wave of itself does not "push electrons" or other charges; hence it is nearly undetectable by present detectors. Ionization detectors such as a Geiger counter tube, e.g., are exceptions if the scalar wave encountered is fairly strong. In that case sufficient triplex coupling with the ionized gas occurs to produce additional ionization or charge, breaching the tube's cutoff threshold and producing a cascade discharge of electrons and voltage which is detected. But weak scalar waves are presently undetectable by ordinary instruments. However, these small scalar waves are detectable by sensitive interferometry techniques -- e.g., such as an electron interferometer. Since the use of such instruments is quite rare, then indeed we have been

living immersed in a sea of scalar waves without knowing it.

Finally, the percentage of scalar waves produced by changes in charged mass pileups can be increased by utilizing charged mass streaming. Essentially the charged masses must be moved suddenly, as quickly as possible, at or near the complete breakdown of the medium. For this reason, Tesla utilized sparkgaps in his early transmission systems, but also found that he could induce ionized media to "breakdown" in such fashion by a slow growth process. One of his early patented atmospheric wireless transmission systems is based on this fact. However, it was necessary to use a very high voltage, insuring extreme stress on the medium and hence some spillover stress onto time itself. In other words, THETA-3 is always an approximation; at sufficiently high spatial stress, sufficient spillover THETA-4 exists to give Tesla scalar waves. For this reason, Tesla used very high voltages and extremely sharp discharges to give "streaming" of the charged masses and thus high percentages of THETA-4 waves. This suggests that the breakdown of dielectrics is a much richer phenomenon than is presently allowed for in the conventional theory.

To summarize, electrostatic potential -- THETA field -- is stress on the spacetime medium at a four-dimensional point. I.e., it is a sort of pressure on the medium, but pressure on all four dimensions, not just on the three spatial dimensions. Thus in the new standard theory, THETA-4 may have complex values. In addition, a PHI-wave is to be interpreted as a scalar longitudinal wave in complex spacetime -- directly in THETA-0, the normal average 4-space stress itself. And charge and charged mass must be recognized as two separate concepts. This is the gist of what I finally recognized about Nikola Tesla's work and fundamental discovery.

This is exciting, for it means that Tesla stress waves can affect either space or time individually, or both space and time simultaneously, or even oscillate back and forth between primarily affecting time and primarily affecting space. Tesla's waves were actually these THETA-field scalar waves. As such, they were fundamentally different from ordinary electromagnetic waves, and had entirely different characteristics, just as Tesla often stated. E.g., a Tesla wave can either move spatially, with time flowing linearly; move temporally only (sitting at a point and waxing and waning in magnitude -- but changing the rate of flow of time itself in doing so, and affecting gravitational field, fundamental constants of nature, etc.), or move in a combination of the two modes. In the latter case, the Tesla wave moves in space with a very strange motion -- it oscillates between,
(1) spatially standing still and flexing time
(2) moving smoothly in space while time flows smoothly and evenly.
I.e., it stands at one point (or at one columnar region), flexing for a moment; then slowly picks up spatial velocity until it is moving smoothly through space; then slows down again to a "standing column," etc. This is Tesla's fabulous "standing columnar wave."

Another wild characteristic of the Tesla wave is that it can affect the rate of flow of time itself; hence it can affect or change every other field -- including the gravitational field -- that exists in time flow. It can also affect all universal constants, the mass of an object, the inertia of a body, and the mind and thoughts as well! All of these exist in the flow of time, and they are affected if the time stream in which they exist is affected. This was the awful secret that Tesla partially discovered by 1900, and which he came more and more to fully realize as he pursued its nature and its ramifications into the 1920's and 1930's.

Tesla also found he could set up standing THETA-field waves through the earth. He in fact intended to do so, for he had also discovered that all charges in the highly stressed earth regions in which such a standing wave existed produced THETA- fields which would feed (kindle) energy into the standing THETA- field wave by pair coupling. I.e., normal vector field energy would "assemble" onto the scalar matrix wave by means of pair-coupling. Thus by transmitting a scalar wave into the earth, he could easily tap the fiery scalar fields produced in the molten core of the planet itself, turning them into ordinary electromagnetic energy. In such case, a single generator would enable anyone to put up a simple antenna and extract all the free energy they desired.

When Tesla's alarmed financial backers discovered this was his real intent, they considered him a dangerous madman and found it necessary to ruthlessly stop him at all costs. And so his financial support was withdrawn, he was harassed in his more subtle patent efforts (and the patents themselves were adulterated), and his name gradually was removed from all the electrical textbooks. By 1914 Tesla, who had been the greatest inventor and scientist in the world, had become essentially a nonperson.

A few other persons in the early 1900's also were aware that potential and voltage are different. And some of them even learned to utilize Tesla's PHI-field, even though they only vaguely understood they were utilizing a fundamentally different kind of electromagnetic wave. For example, James Harris Rogers patented an undersea and underground communications system which Tesla later confirmed utilized Tesla waves. The U.S. secretly

used the Rogers communications system in World War I to communicate with U. S. submarines underwater, and to communicate through the earth to the American Expeditionary Force Headquarters in Europe. The Rogers system was declassified after the War --and very shortly after that, it had mysteriously been scrubbed off the face of the earth. Again, potential stress waves -- Tesla waves -- were eliminated and "buried."

Probably the most brilliant inventor and researcher into Tesla's electromagnetics was T. Henry Moray of Salt Lake City, Utah. Dr. Moray actually succeeded in tapping the limitless zero-point energy of vacuum (spacetime) itself. By 1939, Dr. Moray's amplifier contained 29 stages and its output stage produced 50 kilowatts of power from vacuum. Interestingly, another 50 kilowatts could be tapped off any other stage in the device -- which consequently could have produced almost 1.5 megawatts of electrical power! Dr. Moray's epoch-making work was suppressed also. His device -- which represented over 20 years of heartbreaking accumulation of 29 working tubes from thousands made -- was destroyed by a Soviet agent in 1939, but not before the agent had obtained the drawing for building the tubes and the device itself. Today the Moray amplifier is a standard component of many of the Soviet secret superweapons and Tesla weapons.

In the 20's and 30's, Tesla announced the final perfection of his wireless transmission of energy without losses -- even to interplanetary distances. In several articles (e.g., H. Winfield Secor, "Tesla Maps Our Electrical Future," Science and Invention, Vol. XVII, No. 12, pp. 1077, 1124-1126), Tesla even revealed he used longitudinal stress waves in his wireless power transmission.

Quoting from the article,

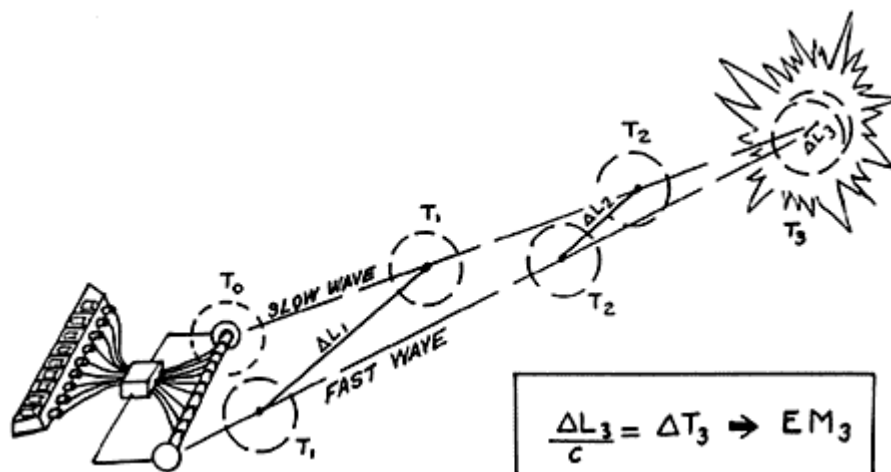
"Tesla upholds the startling theory formulated by him long ago, that the radio transmitters as now used, do not emit Hertz waves, as commonly believed, but waves of sound."

"He says that a Hertz wave would only be possible in a solid either, but he has demonstrated already in 1897 that the either is a gas, which can only transmit waves of sound; that is such as are propagated by alternate compressions and rarefactions of the medium in which transverse waves are absolutely impossible."

The wily Tesla did not reveal, of course, that such scalar waves nearly always immediately pair-coupled into vector waves when produced by normal means. Tesla himself was working with longitudinal scalar waves.

In the 1930's Tesla announced other bizarre and terrible weapons: a death ray, a weapon to destroy hundreds or even thousands of aircraft at hundreds of miles range, and his ultimate weapon to end all war -- the Tesla shield, which nothing could penetrate. However, by this time no one any longer paid any real attention to the forgotten great genius. Tesla died in 1943 without ever revealing the secret of these great weapons.

Unfortunately, today in 1981 the Soviet Union has long since discovered and weaponized the Tesla scalar wave effects. Here we only have time to detail the most powerful of these frightening Tesla weapons -- which Brezhnev undoubtedly was referring to in 1975 when the Soviet side at the SALT talks suddenly suggested limiting the development of new weapons "more frightening than the mind of man had imagined." One of these weapons is the Tesla howitzer recently completed at the Saryshagan missile range and presently considered to be either a high energy laser or a particle beam weapon. (See Aviation Week & Space Technology, July 28, 1980, p. 48 for an artist's conception.)



for more information, [click above image](#)

TESLA HOWITZER
(SCALAR INTERFEROMETER)

The Saryshagan howitzer actually is a huge Tesla scalar interferometer with four modes of operation. One continuous mode is the Tesla shield, which places a thin, impenetrable hemispherical shell of energy over a large defended area. The 3-dimensional shell is created by interfering two Fourier-expansion, 3-dimensional scalar hemispherical patterns in space so they pair-couple into a dome-like shell of intense, ordinary electromagnetic energy. The air molecules and atoms in the shell are totally ionized and thus highly excited, giving off intense, glowing light. Anything physical which hits the shell receives an enormous discharge of electrical energy and is instantly vaporized -- it goes pfft! like a bug hitting one of the electrical bug killers now so much in vogue.

If several of these hemispherical shells are concentrically stacked, even the gamma radiation and EMP from a high altitude nuclear explosion above the stack cannot penetrate all the shells due to repetitive absorption and re-radiation, and scattering in the layered plasmas.

In the continuous shield mode, the Tesla interferometer is fed by a bank of Moray free energy generators, so that enormous energy is available in the shield. A diagram of the Saryshagan-type Tesla howitzer and the Tesla shield produced by the howitzer.

In the pulse mode, a single intense 3-dimensional scalar Theta-field pulse form is fired, using two truncated Fourier transforms, each involving several frequencies, to provide the proper 3-dimensional shape (TESLA-3). This is why two scalar antennas separated by a baseline are required. After a time delay calculated for the particular target, a second and faster pulse form of the same shape is fired from the interferometer antennas. The second pulse overtakes the first, catching it over the target zone and pair-coupling with it to instantly form a violent EMP of ordinary vector (Hertzian) electromagnetic energy. There is thus no vector transmission loss between the howitzer and the burst. Further, the coupling time is extremely short, and the energy will appear sharply in an "electromagnetic pulse (EMP)" striking similar to the 2-pulsed EMP of a nuclear weapon. This type is what actually caused the mysterious flashes off the southwest coast of Africa, picked up in 1979 and 1980 by Vela satellites. The second flash, e.g., was in the infrared only, with no visible spectrum. Nuclear flashes do not do that, and neither does super-lightening, meteorite strikes, meteors, etc. In addition, one of the scientists at the Arecibo Ionospheric Observatory observed a gravitational wave disturbance -- signature of the truncated Fourier pattern and the time-squeezing effect of the Tesla potential wave -- traveling toward the vicinity of the explosion.

The pulse mode may be fed from either Moray generators or -- if the Moray generators have suffered their anomalous "all fail" malfunction -- ordinary explosive generators. Thus the Tesla howitzer can always function in the pulse mode, but it will be limited in power if the Moray generators fail.

In the continuous mode, two continuous scalar waves are emitted - - one faster than the other -- and they pair-couple into vector energy at the region where they approach an in-phase condition. In this mode, the energy in the distant "ball" or geometric region would appear continuously and be sustained -- and this is Tesla's secret of wireless transmission of energy at a distance without losses. It is also the secret of a "continuous fireball" weapon capable of destroying hundreds of aircraft or missiles at a distance.

The volume of the Tesla fireball can be vastly expanded to yield a globe which will not vaporize physical vehicles but will deliver an EMP to them to dud their electronics. A test of this mode has already been witnessed, See Gwyne Roberts, "Witness to a Super Weapon?", the London Sunday Times, 17 August 1980 for several tests of this mode at Saryshagan, seen from Afghanistan by British TV cameraman and former War Correspondent Nick Downie.

If the Moray generators fail anomalously, then a continuous mode limited in power and range could conceivably be sustained by powering the interferometer from more conventional power sources such as advanced magneto-hydrodynamic generators.

Typical strategic ABM uses of Tesla weapons are shown in Tesla- 4. In addition, of course, smaller Tesla howitzer systems for anti-tactical ballistic missile defense of tactical troops and installations could be constituted of more conventional field missile systems using paired or triplet radars, of conventional external appearance, in a scalar interferometer mode.

With Moray generators as power sources and multiply deployed reentry vehicles with scalar antennas and

transmitters, ICBM reentry systems now can become long range "blasters" of the target areas, from thousands of kilometers distance (TESLA-5). Literally, "Star Wars" is liberated by the Tesla technology. And in air attack, jammers and ECM aircraft now become "Tesla blasters." With the Tesla technology, emitters become primary fighting components of stunning power.

The potential peaceful implications of Tesla waves are also enormous. By utilizing the "time squeeze" effect, one can get antigravity, materialization and dematerialization, transmutation, and mind boggling medical benefits. One can also get subluminal and superluminal communication, see through the earth and through the ocean, etc. The new view of Theta-field also provides a unified field theory, higher orders of reality, and a new super-relativity, but detailing these possibilities must wait for another book.

With two cerebral brain halves, the human being also has a Tesla scalar interferometer between his ears. And since the brain and nervous system processes avalanche discharges, it can produce (and detect) scalar Tesla waves to at least a limited degree. Thus a human can sometimes produce anomalous spatio-temporal effects at a distance and through time. This provides an exact mechanism for psychokinesis, levitation, psychic healing, telepathy, precognition, postcognition, remote viewing, etc. It also provides a reason why an individual can detect a "stick" on a radionics or Hieronymus machine (which processes scalar waves), when ordinary detectors detect nothing. Unfortunately there is not room to develop the implications of this human Tesla interferometry in detail, for that must wait for yet another book, presently in its initial stages, that Hal Crawford and I are writing.

At the July 1981 U.S. Psychotronics Association's Annual Conference in Dayton, Ohio, I presented the first rough paper on the Tesla secret and scalar interferometry. A videotape of the presentation was made and will shortly be available. I am also scheduled to make a special presentation at the Alternate Energy Conference in Toronto, Canada in latter October, 1981. A professional, videotaped two-hour presentation on this subject is also being prepared. Wide distribution of the material through the international underground physics and technology network has already been made. This time, God willing, Tesla's secret will not be suppressed for another 80 years!

And perhaps it is not yet too late. The material has cost me (now) some 16 years of agonizing labor and nearly \$100,000 of my own personal funds. No orthodox university, scientific group, foundation, or governmental agency would support such an effort, either financially or otherwise. Indeed, most ordinary journals will not even accept material on such matters. Nonetheless, the area is of overwhelming importance -- and I truly believe Tesla's lost secret will shortly affect the lives of every human being on earth.

Perhaps with the free and open release of Tesla's secret, the scientific and governmental bureaucracies will be shocked awake from their slumber, and we can develop defense before Armageddon occurs. Perhaps there is hope after all -- for even Brezhnev, in his strange July, 1975 proposal to the SALT talks, seemed to reveal a perception that a turning point in war and weaponry may have been reached, and that human imagination is incapable of dealing with the ability to totally engineer reality itself. Having tested the weapons, the Soviets must be aware that the ill-provoked oscillation of time flow affects the minds and thoughts -- and the very life streams and even the collective species unconsciousness -- of all life forms on earth. They must know that these weapons are two-edged swords, and that the backlash from their use can be far more terrible to the user than was the original effect to his victim.

If we can avoid the Apocalypse, the fantastic secret of Nikola Tesla can be employed to cure and elevate man, not kill him. Tesla's discovery can eventually remove every conceivable external human limitation. If we humans ourselves can elevate our consciousness to properly utilize the Tesla electromagnetics, then Nikola Tesla -- who gave us the electrical twentieth century in the first place -- may yet give us a fantastic new future more shining and glorious than all the great scientists and sages have imagined.

NIKOLA TESLA'S NEW WIRELESS

The Electrical Engineer - London Dec. 24, 1909, p. 893

Mr. Nikola Tesla has announced that as the result of experiments conducted at Shoreham, Long Island, he has perfected a new system of wireless telegraphy and telephony in which the principles of transmission are the direct opposite of Hertzian wave transmission. In the latter, he says, the transmission is effected by rays akin to light, which pass through the air and cannot be transmitted through the ground, while in the former the Hertz waves are practically suppressed and the entire energy of the current is transmitted through the ground exactly as though a big wire. Mr. Tesla adds that in his experiments in Colorado it was shown that a very powerful current developed by the transmitter traversed the entire globe and returned to its origin in an interval of 84 one-

thousandths of a second, this journey of 24,000 miles being effected almost without loss of energy.

TESLA'S NEW DEVICE LIKE BOLTS OF THOR

NEW YORK TIMES Dec. 8, 1915, p. 8, col. 3

He Seeks to Patent Wireless Engine for Destroying Navies by Pulling a Lever.
To Shatter Armies Also.

"Impractical," He says of Westerner's Plan to Circle Country with Electric Fire.

Nikola Tesla, the inventor, winner of the 1915 Nobel Physics Prize, has filed patent applications on the essential parts of a machine the possibilities of which test a layman's imagination and promise a parallel of Thor's shouting thunderbolts from the sky to punish those who angered the gods. Dr. Tesla insists there is nothing sensational about it, that it is but the fruition of many years of work and study. He is not yet ready to give the details of the engine which he says will render fruitless any military expedition against a country which possesses it. Suffice to say that the destructive invention will go through space with a speed of 300 miles a second, and manless airship without propelling engine or wings, sent by electricity to any desired point on the globe on its errand of destruction, if destruction its manipulator wishes to effect.

Ten miles or a thousand miles, it will be all the same to the machine, the inventor says. Straight to the point, on land or on sea, it will be able to go with precision, delivering a blow that will paralyze or kill, as is desired. A man in a tower on Long Island could shield New York against ships or army by working a lever, if the inventor's anticipations become realizations.

"It is not the time," said Dr. Tesla yesterday, "to go into the details of this thing. It is founded on a principle that means great things in peace, it can be used for great things in war. But I repeat, this is no time to talk of such things.

"It is perfectly practicable to transmit electrical energy without wires and produce destructive effects at a distance. I have already constructed a wireless transmitter which makes this possible, and have described it in my technical publications, among which I may refer to my patent 1,119,732 recently granted. With transmitters of this kind we are enabled to project electrical energy in any amount to any distance and apply it for innumerable purposes, both in peace and war. Through the universal adoption of this system, ideal conditions for the maintenance of law and order will be realized, for then the energy necessary to the enforcement of right and justice will be normally productive, yet potential, and in any moment available, for attack and defense. The power transmitted need not be necessarily destructive, for, if existence is made to depend upon it, its withdrawal or supply will bring about the same results as those now accomplished by force of arms.

Dr. Tesla then said that it would be possible with his wireless mechanism to direct an ordinary aeroplane, manless, to any point over a ship or an army, and to discharge explosives of great strength from the base of operations.

Asked to express an opinion upon the announcement last Sunday of Charles H. Harris, and electrical engineer of Los Angeles, that he would be able to surround this country with an electrical wall of fire in time of war, Dr. Tesla gave it as his opinion that Mr. Harris was not practical.

"It is hard to stamp as impossible such results as those described in the press dispatches to which you refer. Granted, however, that the project is feasible, it would take more than all the motive power obtainable in the United States to throw a wall of fire around the country. In fact, even the passage of small currents at considerable distances through air consumes a great deal of energy on account of the immense pressure required. So, for instance, in lightning discharges, energy may be delivered at the rate of billions of horsepower, though the currents are of smaller volume than those developed by electrical generators in our power houses."

The Motionless Electromagnetic Generator

Extracting Energy from a Permanent Magnet

Introduction

For about 10 years the inventors have been working together as a team, and exploring many avenues whereby electromagnetic energy might be extracted from various sources of potential, and eventually from the active vacuum itself.

This has been very arduous and difficult work, since there were no guidelines for such a process whereby the electrical power system becomes an open dissipative system in the manner of Prigogine's theoretical models {17-19} but using determinism instead of statistics. There was also no apparent precedent in the patent database or in the scientific database.

Since the present "standard" U(1) electrodynamics model forbids electrical power systems with $COP > 1.0$, we also studied the derivation of that model, which is recognized to contain flaws due to its 136-year old basis. We particularly examined how it developed, how it was changed, and how we came to have the Lorentz-regauged Maxwell-Heaviside equations model ubiquitously used today, particularly with respect to the design, manufacture, and use of electrical power systems.

Our approach was that the Maxwell theory is well-known to be a material fluid flow theory, since the equations are hydrodynamic equations. So in principle, anything that can be done with fluid theory can be done with electrodynamics, since the fundamental equations are the same mathematics and must describe consistent analogous functional behavior and phenomena. This means that EM systems with "electromagnetic energy winds" from their external "atmosphere" (the active vacuum) are in theory quite possible, analogous to a windmill in a wind.

The major problem was that the present classical EM model excluded such EM systems. We gradually worked out the exact reason for the arbitrary exclusion that resulted in the present restricted EM model, where and when it was done, and how it was done. It turned out that Ludvig Valentin Lorenz {55} symmetrically regauged Maxwell's equations in 1867, only two years after Maxwell's seminal publication in 1865, and Lorenz first made the arbitrary changes that limited the model to only those Maxwellian systems in equilibrium in their energy exchange with their external environment (specifically, in their exchange with the active vacuum).

This is not a law of nature and it is not the case for the Maxwell-Heaviside theory prior to Lorenz's (and later H. A. Lorentz's) alteration of it. Thus removing this symmetrical regauging condition {31, 34-38} is required - particularly during the discharge of the system's excess potential energy (the excitation) in the load.

Later the great H. A. Lorentz, working independently and apparently unaware of Lorenz's previous 1867 work, independently regauged the Maxwell-Heaviside equations so they represented a system that was in equilibrium with its active environment.

Implications of the Arbitrarily Curtailed Electrodynamics Model

Initially an electrical power system is asymmetrically regauged by simply applying potential, so that the system's potential energy is nearly instantly changed. The well-known gauge freedom principle in gauge field theory assures us that any system's potential - and hence potential energy - can be freely changed in such fashion. In principle, this potential energy can then be freely discharged in loads to power them, without any further input from the operator. In short, there is absolutely no theoretical law or law of nature that prohibits $COP > 1.0$ electrical power systems - else we have to abandon the successful modern gauge field theory.

But present electrical power systems do no such thing. However, all of them do accomplish the initial asymmetrical regauging by applying potential. So all of them do freely regauge their potential energy, and the only thing the energy input to the shaft of a generator (or the chemical energy available to a battery) accomplishes is the creation of the potentializing entity - the source dipole.

It follows that something the present systems perform in their discharge of their nearly-free¹ regauging energy must prevent the subsequent simple discharge of the energy to power the loads unless further work is done on the input section. In short, some ubiquitous feature in present systems must self-enforce the Lorentz symmetry condition (or a version of it) whenever the system discharges its free or nearly free excitation energy.

Lorentz's curtailment of the Maxwell-Heaviside equations greatly simplified the mathematics and eased the solution of the resulting equations, of course. But applied to the design of circuits - particularly during their excitation discharge - it also discarded the most interesting and useful class of Maxwellian systems, those exhibiting $COP > 1.0$.

¹ In real systems, we have to pay for a little switching costs, e.g., but this may be minimal compared to the potential energy actually directed or gated upon the system to potentialize it. Consequently, Lorentz² unwittingly discarded all Maxwellian systems with "net usable EM energy winds" during their discharge into their loads to power them. Thus all present systems - which have been designed in accord with the Lorentz condition - cannot use the electromagnetic energy winds that freely arise in them by simple regauging, due to some universal feature in the design of every power system that prevents such action.

We eventually identified the ubiquitous closed current loop circuit as the culprit which enforces a special kind of Lorentz symmetry during discharge of the system's excitation energy. With this circuit, the excitation-discharging system must destroy the source of its EM energy winds as fast as it powers its loads and losses, and thus faster than it actually powers its loads.

Also, as we stated and contrary to conventional notions, batteries and generators do not dissipate their available internal energy (shaft energy furnished to the generator, or chemical energy in the battery) to power their external circuits and loads, but only to restore the separation of their internal charges, thereby forming the source dipole connected to their terminals. Once formed, the source dipole then powers the circuit {16, 22}.

Some Overlooked Principles in Electrodynamics

We recovered a major fundamental principle from Whittaker's {1} profound but largely ignored work in 1903.

Any scalar potential is a priori a set of EM energy flows, hence a set of "electromagnetic energy winds" so to speak. As shown by Whittaker, these EM energy winds pour in from the complex plane (the time domain) to any x, y, z point in the potential, and pour out of that point in all directions in real 3-space {1, 26, 43}.

Further, in conventional EM theory, electrodynamicists do not actually calculate or even use the potential itself as the unending set of EM energy winds or flows that it actually is, but only calculate and use its reaction cross section with a unit point static charge at a point. How much energy is diverged around a single standard unit point static coulomb, is then said to be the "magnitude of the potential" at that point. This is a non sequitur of first magnitude.³

E.g., just as the small "swirl" of water flow diverged to stream around an intercepting rock in a river bottom is not the river's own flow magnitude, and certainly is not the "magnitude of the river", neither is the standard reaction cross section of the potential a measure of the potential's actual "magnitude".

Indeed, the potential's "magnitude" with respect to any local interception and extraction of energy from it, is limited only by one's ability to,

(1) intercept the flow

(2) diverge it into a circuit to power the circuit

The energy flows identically comprising the potential {1} replenish the withdrawn energy as fast as it can be diverged in practical processes, since the energy flows themselves move at the speed of light.

² Although Lorenz did this first, such was H.A. Lorentz's prestige that when he advanced symmetrical regauging, it was rather universally adopted by electrodynamicists, and is still used by them today. E.g., see J.D. Jackson, Classical Electrodynamics, 2nd Edition, Wiley, New York, 1975, p. 219-221; 811-812.

³ E.g., just replace the assumed unit point static charge assumed at each point with n unit point static charges, and the collected energy around the new point charge will be n times the former

collection. If the former calculation had yielded the actual magnitude of the potential at that point, its magnitude could not be increased by increasing the interception. But since the potential is actually a flow process, increasing the reaction cross section of the interception increases the energy collection accordingly.

The Priore Machine and Phase Conjugation

In the 1960's and 1970's, in France Antoine Priore built and tested electromagnetic healing machines of startling effectiveness.

In hundreds and hundreds of rigorous tests with laboratory animals, Priore's machine cured a wide variety of the most difficult kinds of terminal, fatal diseases known today.

Funded by the French government in the amount of several million dollars, Priore's machines concretely demonstrated a nearly 100% cure of all kinds of terminal cancers and leukemias, in thousands of rigorous laboratory tests with animals. These results were shown to medical scientists as early as 1960.

Many of the experiments and tests were done by prestigious members of the French Academy of Sciences. Robert Courrier, head of the Biology Section: and Secetaire Perpetuel, personally introduced Priore's astounding results to the French Academy.

The operation of the Priore machine was seemingly incomprehensible. Many orthodox French scientists - some of them world renowned - were outraged at the success of such a machine, shrilling that science had nothing to do with "black boxes."

They loudly called upon the inventor to explain the mechanism utilized by his machine, but the inventor either wouldn't or couldn't explain the curative mechanism.

Priore certainly knew how to build the machine and make it work. It is debatable to this day whether anyone - Priore included - actually understood its principle of operation.

Neither the French Academy nor Antoine Priore knew anything of phase conjugation at the time.

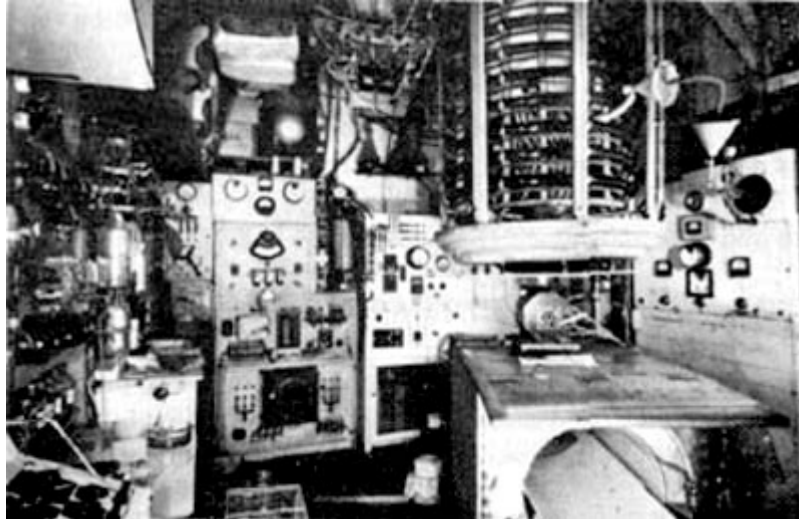
In fact, the entire Western World knew nothing of phase conjugation in the 1960's when Priore was getting his finest results. At that time, only the Soviets knew of time-reversed waves.

Certainly Priore's machine was impressive.

Into a tube containing a plasma of mercury and neon gas, a pulsed 9.4 gigahertz wave modulated upon a carrier frequency of 17 megahertz was introduced. These waves were produced by radio emitters and magnetrons in the presence of a 1,000 gauss magnetic field. Experimental animals were exposed to this magnetic field during irradiation, and the mixture of waves (some 17 or so) coming from the plasma tube and modulating and riding the magnetic field passed through the animals' bodies.

Amongst other things, a plasma can convert a transverse wave to a longitudinal wave. Also, phase conjugate (time-reversed) waves can be produced by plasmas.

Priore's apparatus produced a scalar EM wave/signal with deliberately constructed, infolded components including phase conjugate waves.



One of Priore's intermediate devices.
This device cured terminal cancers
and leukemias in thousands of laboratory animals.
(Courtesy Bob Whitney)

One may roughly view a cancer cell as a normal human cell gone "awry" and out of control of the body's master cellular control system.

The cancerous cells, viewed as a sort of separate, parasitic group of cells, form a special kind of organism having its own master cellular control system "level," immersed in the host's biopotential.*

* One strongly points out the relevance of Dr. Robert Becker's epochal experiments proving that cells can be dedifferentiated and redifferentiated electrically. Those experiments are strong indicators that the cancer cell should be capable of being reverted to its more primitive state - that of the normal cell - by electromagnetic means.

There is thus a specific, constant electromagnetic "delta" that differentiates the parasitic cancerous "organism" from the normal-human cellular organism.

This "delta" can be considered a sort of constant, complex-structured charge existing in the body's atomic nuclei. It's exactly as if the body biopotential had been charged up by Kaznacheyev's "death photons" for that specific cancer condition.

If this cancerous "delta" (which may be rather like a complex intermodulation mix of waves) - or a frequency shifted "transform" of it to a different frequency band - is phase conjugated, a specific healing delta frequency pattern results.

If phase conjugate replicas of a cancer's cell's specific "delta" frequencies are fed into the body having that cancer, the deviation of the cancer cell's master cellular control system will be "time reversed."

That will return the cancer cell to control of the animal's proper master cellular control system. The cancerous cell will be immediately destroyed, or reverted back to a normal cell of the animal.

A very similar process exists for just about every disease bacterium and infectious agent that attacks the body.

Phase Conjugates of "Death Photons" are "Healing Photons"

The Kaznacheyev experiments in the Soviet Union proved that any cellular death and disease pattern can be induced by a specific electromagnetic pattern carried on an electromagnetic signal, if the target cells are bombarded with the pattern-carrying carrier signals for a length of time.

What was not published of Kaznacheyev's work was the correspondent work showing electromagnetic reversal of cellular death and disease conditions by irradiating the diseased cell cultures by phase conjugate replicas of

the pattern-carrying induction signal.

In simplified terms, if an action in forward time induces a condition, then the time-reversal of that action will reverse the condition.

The concept is almost laughably simple. The time-reversal of an electromagnetic disease process is a specific healing process for that disease.

In his device, Priore internally structured the carrier photons themselves - making them vacuum engines. He phase conjugated his vacuum engines, and then passed these time-reversed vacuum engines down and through a strong magnetic field which thoroughly penetrated all cells of the biological organism being treated.

The scalar components (structured photons) representing the time-reversal of the disease were absorbed and reradiated in all the cells, "charging up" the nuclei of the atoms in the organism to some potential level of the exact "healing and reversing pattern."

In the process, the cancer/leukemia pattern/charge also destroyed the cancer cells, or converted them back to normal cells as appropriate.

As a highly simplified analogy, the complex signal - viewed as a scalar Fourier expansion - represented a "stress" against any abnormal cellular control system encountered and returned it to the normal cell's master cellular control system of the body.

- Encountering the normal control system in normal cells, it produced zero stress.
- Encountering the abnormal control system in tumorous cells, it produced great stress on it, reverting it to the normal control system of the body's normal cells.

Thus to a normal cell the Priore signal pattern acted somewhat as a comb passing through one's hair.

No interference occurred with the normal cell (one whose scalar control pattern is phase-locked to the body's master cellular control system and in phase with it).

The Priore signal stimulated and "stroked" the normal cell, but did not hurt it at all.

On the other hand, the scalar control pattern in and of an abnormal (cancerous) cell is out of phase with the body's master cellular control system, and is not phase-locked to it.

Hence the Priore signal caused direct interference with the abnormal cell's independent scalar control system. The interference pattern constituted the reconstruction of normal energy directly in the cancerous cell, and also jammed its abnormal scalar life signal.

This destroyed the cancerous cell by two mechanisms:

1. physical energy was kindled directly in the abnormal cell, causing direct mechanical damage
2. the cancerous cell, being an "independent living critter," had its scalar life channel (connecting its primitive "mind" to its "body") jammed and stopped

If the cancerous cell was reverted to a normal cell by the Priore stress before being destroyed, it became just a normal cell and the Priore stress had no further effect upon it.

The Effect is Universally Applicable

Any disease with cellular, biochemical, or genetic basis can be cured in like fashion.

Priore's method, for example, was clearly shown to be able to completely reverse clogging of the arteries with fatty deposits, and to be able to lower the cholesterol level to normal, even in the presence of an abnormally high cholesterol diet.

His method also showed complete mastery and cure of sleeping sickness and trypanosome-induced illnesses.

Often Priore found that every cell of the body - even the hair - must be irradiated and treated ("charged up") with the signal, for the disease pattern was in every cell. The master cellular control system is holographic - the pattern (substructured potential with its dynamic, oscillating components) is in each component (each atomic

nucleus, hence in each cell.)

Every structural level of the body larger than the cell also has its own correlated pattern, or modulation, on the overall.

A biological organism can regenerate lost limbs, for example, if it can utilize its natural recovery process in a Priore manner.

Even though Priore's work was presented to the French Academy of Sciences by Robert Courier, the prestigious head of the Biology Section, the Academy could not understand the device and its functioning.

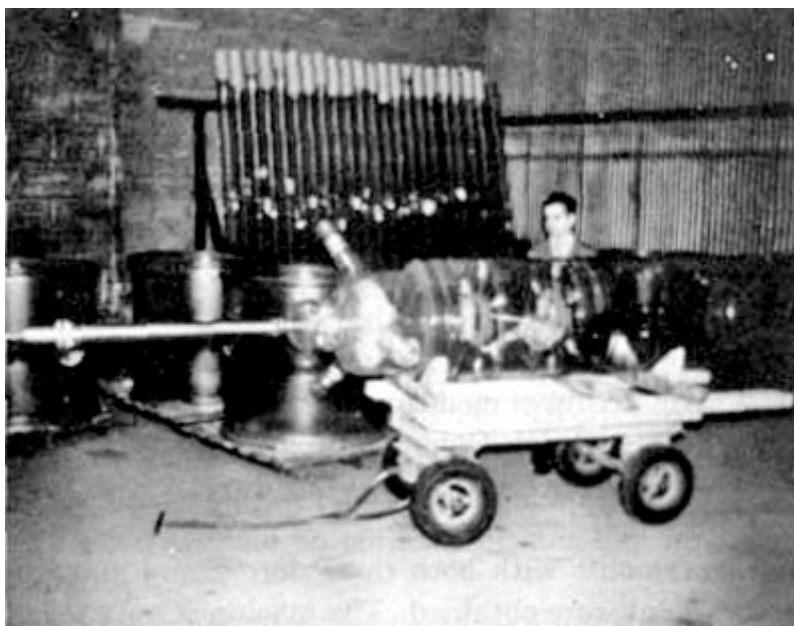
That was because the Academicians knew nothing of scalar electromagnetics, and phase conjugation, and the Priore machine was a scalar electromagnetic device using phase conjugation.

In the Mid-70's It Ended

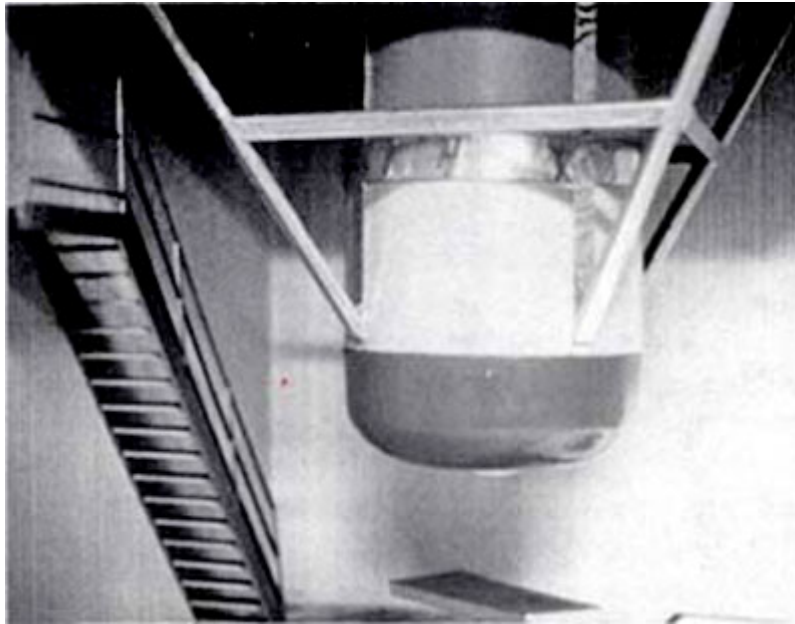
In 1974, a change of local government lost Priore his government supporters. His support and funding were lost.

Ironically, Priore was just completing a 4-stories-tall apparatus capable of radiating and treating entire human bodies. It would have been capable of curing cancer and leukemia in humans rather than just in laboratory rats. (His previous machines were much smaller, and only a small animal could be irradiated whole-body.)

In that machine Priore used a "1amp," a special section, in which 17 specific frequencies were mixed and modulated upon the 9.4 gigahertz carrier.



The large, special, phase-conjugating plasma tube for Priore's giant device.
The final machine would have treated humans "whole-body."
(Courtesy Bob Whitney)



Capping assembly for the top of Priore's giant plasma tube device.
The last device would have treated human patients "whole-body."
The cap assembly was on the third floor of the device.
(Courtesy Bob Whitney)

The machine was large enough to irradiate humans over their whole body. It should have been capable of curing cancer and leukemia in two five-minute irradiations, one week apart.

While Priore was still alive, with my associates I spent nearly two years of my life in an effort to bring the Priore device to market and into the mainstream of medical research and development.

Robert Whitney, Frank Golden, and Tony Gideon played the major role, going to France and negotiating directly with the Priore group and the French government.

Verbal agreements with both the Priore group and with the French government were obtained. The machines were to be built, assembled, and tested in Bordeaux. Then they were to be dismantled and shipped to the purchasers - large medical research and development laboratories where they would be reassembled on site.

A group of wealthy backers was going to provide the necessary millions to fund the effort. Final contracts were being drawn.

Mysteriously, all funding for the project was suddenly withdrawn. Our backers were "leaned on" very hard and strongly threatened. Nothing we could do could revive the project.

Priore never again recovered his funding, and later died. The machine fell into disarray and was disassembled.

However, the proof that the requisite time-reversed signal can be produced, and will ride down a magnetic field, to penetrate every cell and every atomic nucleus in the body, is already in the present hard-core physics literature, if one knows where to look and how to properly interpret the work.

The fact that such signals can reverse nearly every major cellular illness condition of the body also has been proven by Priore and the scientists who worked with him, and it is in the French scientific literature.

The Priore-type cure for AIDS and other diseases only requires the necessary funding and personnel to be redeveloped and reestablished.

Non-Technical Description of... The Priore Process

In simple terms, it works like this.

There are two mechanisms in the body of concern to treatment of disease and recovery from disease and damage.

- One is the immune system, which is like the soldiers on a battlefield. It attacks the "bad guys" (the invaders) and destroys them. After a great battle, usually it wins (or we would all die), and the battlefield is littered with the residue. The immune system also has large "scavenger" cells when then come in and "clean up the residue". Thereafter, the function of the immune system is over. It does not "heal" anything, even its own damaged cells.
- The actual "healing" system in the body is the cellular regenerative system, poorly studied, and in fact mostly studied by Becker. This is an electromagnetic system, but of a rare kind not used in our common power systems, communication systems, etc.

Instead of using the common transverse EM waves, this system uses longitudinal EM waves and time-polarized EM waves. Ugh!

A time-polarized EM wave is an energy current in the time domain, and the basis for such does appear in a very modern physics theory called quantum field theory. There we are introduced to time-polarized photons, for example. The easiest way to "visualize" a time-polarized oscillation is that, instead of oscillating energy in space, the wave oscillates the rate of flow of time just a little bit.

So it is a "compression and rarefaction of the local rate of flow of time", so to speak.

Anyway, just as biological systems used common electromagnetism, frequency modulation, amplitude modulation etc. for eons before Maxwell finally glued together magnetism and electricity, it has also used this "time-domain" type of "hidden" electrodynamics since the beginning. In fact, it uses it to heal damaged cells, etc. It works this way:

After the Russians briefed Lawrence Livermore Laboratory scientists in 1972 about a strange kind of electromagnetic wave that would suddenly appear in experiments and "restore order", modern phase conjugate optics was born. In extremely simple terms, suppose you "squeeze" (pump) a little particle of nonlinear mass with spatial-energy (normal) EM waves at certain frequencies, and then "tickle" the rhythmically squeezed mass with a separate little EM wave that you input.

Oddly, the energy in the "pumping" waves will be transformed into a strange kind of "backwards traveling" or "crawfish" wave that backtracks the path that the little input wave took. In short, this strange "time-reversed" wave in essence is in magnitude some fraction or amplification of the input wave, and it propagates back along the path taken by the input wave - even if the input wave itself is already "gone"!

So with NORMAL pumping with spatial energy, we create an amplified time-reversal spatial energy wave that REVERSES whatever the input wave did.

Here is the magic in the Priore process:

If we pump (squeeze rhythmically) a living cell in the TIME domain, we pump every part and point of it simultaneously. So we produce an amplified "time-reversal force wave" on each and every part of the mass-energy comprising the cell.

The miraculous thing is that we then precisely "time-reverse" the entire cell and all its parts - including the genetics itself - back along the previous path through time that the cell took in having changes occur to it - such as diseases and damage!

Not only can we amplify and time-reverse the energy in a normal EM wave, but we can now also amplify (shorten the time required to change) and time-reverse the energy comprising a living mass.

We can gradually reverse the damaged or diseased cell back to an earlier physical condition, before the damage or disease was there! The cell itself gradually physically changes.

That is the basic mechanism, uncovered by this researcher, that every living biological system uses to heal itself. That is the final mechanism that Becker so ardently sought and so closely approached in his epochal work, and that is the mechanism that was responsible for the astounding cures achieved by the Priore team in France in the 1960s and early 1970s.

It took me 14 years to decipher that mechanism, so simply explained above.

Anyway, the body ages only because gradually the cellular regenerative system deteriorates a bit, and so can no longer fully restore the cells back to full youthful vigor. The aging process itself can also be reversed and "cured" by precisely the same process.

We emphasize that all the treatment does is accelerate and enhance the human body's own natural healing mechanism - which still does not appear in our medical science, because the type of electrodynamics used by the body's healing process has not even been applied (and seldom even studied) by Western medical scientists.

A rigorous theoretical basis for the foregoing can now be established from the pioneering advanced electrodynamics work of a few great pioneers, such as Evans and Barrett. The electrodynamics that results is in fact a unified field theory, which is now shown by those researchers.

Particularly the magnificent higher symmetry $O(3)$ electrodynamics advanced by Evans has "met in the middle" with Sachs' unified field theory, and so the combined Sachs-Evans theory is now able to fully model and explain the mechanisms involved.

Yet our scientific community remains hostile to the very notion of EM healing, even though the natural healing mechanism used in all biological systems is purely electrodynamics - albeit a most unusual form of electrodynamics that the medical scientists do not study.

I also found a way independently to greatly accelerate the Priore method, and then discovered later that French researchers had previously uncovered this mechanism, without at all understanding it. Nonetheless they first demonstrated it. In the Priore method, one must irradiate the entire body of the patient (or animal subject) with longitudinal EM waves, made from plasmas, etc.

Priore embedded these waves in rippling magnetic field carriers, to guarantee that the deepest bone marrow was penetrated and exposed to the non-ionizing radiation. Irradiation with longitudinal waves stimulates the body to produce a little more of the time-polarized "pump" waves, hence achieves some "pumping" of the required type in the living cells.

That results in "time-reversal" of the damaged cells back to health; in short, an accelerated natural healing process.

In the new method, if the exact spectrum of EM radiation FROM a diseased or cellularly-damaged body is captured and amplified, and then fed back into the body, one finds a very strange process occurs. Imagine that you have a great ship with portholes, and there are many dynamic processes ongoing in that ship, which all emit light, etc.

The light reflects from many things in the ship, but eventually emerges from the portholes. Now imagine that you could put back in stronger light precisely antiparallel to the emerging light, of exactly the same frequency, waveform, patterning, etc. All that amplified light energy would now travel backwards through all those (assumed) reflection paths, and arrive back at all the original processes.

But the arriving energy is greater than the ongoing emerging energy, so the processes get "reversed" back to a previous state of operation.

In short, the "porthole" effect uses only ordinary EM radiation, but very precisely and very carefully measured and tailored. Yet it will also engender the same time-domain pumping back in all the deep interaction of the body, in every cell and every part of it. In short, we get a direct and very quick time-reversal of all those physical processes.

This method is very dramatic, and very quick (less than one minute irradiation). It is also agonizing to the patient during irradiation (it has been done surreptitiously on dogs, e.g., by a researcher who wisely conceals his identity) and did rejuvenate an aged, crippled German shepherd.

All of this, properly funded with a great scientific team carefully chosen, can provide a revolutionary new medical therapy.

There are no such things as "resistant pathogens" to the process; everything is mass energy and just get backed up right out of there. Indeed, the exchange between the pathogen and the host's immune system, where the pathogen finally succeeded in tricking or avoiding the immune system (as in AIDS), is also reversed back out of there, and the immune system is also restored to full vigor.

The result is that the immune system now recognizes the pathogens again completely, and goes after them vigorously. In short, the body is again able to use its full healing power against the "resistant" organism again, completely negating the "deception" that was achieved by the pathogen.

But this science will never be born from the official science community, because those who control the funds for research will simply not allow it. It will require a private group or private wealthy person to fund the research necessary to do it.

Let us hope that the day comes when the funds are available, and we then do get on finally with developing a science of total healing, to replace and augment the present medical science of cut, burn, kill, and vaccinate.

In response to a further query on this subject, Dr. Bearden responds:
I know of no other reference to time-reversing the cells electromagnetically than my own papers.
In biology, the change of a cell to a previous or "more primitive" state is called dedifferentiation.

The change of a cell "forward" or to a "more specialized" state is called "differentiation". So the change of the cell back to a more primitive state or forward to a more specialized state is well-known.

Another area involved is cellular regeneration.

Robert Becker's work is probably the best and most advanced example of the state of the art of the study that has been done of the "cellular regeneration system", particularly from the standpoint of inducing changes in it by electromagnetic means. Becker did, I feel, induce the phase conjugation effects, but during much of his work (earlier, 1960s) modern phase conjugate optics had not even been born.

It eventually got started after Russian researchers briefed U.S. researchers at Lawrence Livermore National Laboratory about a strange EM wave in reactions that would come back out and "restore order" in disordering processes. Even then, it really did not get well underway until about 1979 or 1980, except for a handful of U.S. researchers such as Yariv and Fisher.

So Becker's work used ordinary EM electromagnetics, without the phase conjugate part of the theory - but his work did show some of the effects. He certainly was able to stimulate regeneration or partial regeneration of limbs in certain test species.

As another problem, even today phase conjugate electromagnetics does NOT deal with reversing mass-energy itself, so that the mass is "time-reversed". Instead, it is concerned only with forming a time-reversed replica of an input wave (as in 4-wave mixing). The beauty of the process is that the two oppositive "pump" waves add energy to the phase conjugate replica wave that is born in response to the stimulus wave (called the "signal" wave).

So the resulting time-reversed wave may have greater energy than the stimulus way to which it responded.

But some of the characteristics are most interesting. The stimulated time-reverse wave will "travel" or appear back along through space over the exact path, point by point, that the stimulus or input wave took when it came in. (This is the simplest case; it is possible to force the emitted time-reverse wave in the forward direction as well, etc.).

Here is the point: We may consider the energy in an ordinary EM wave to be oscillating in a plane (the wavefront - which is traveling at the speed of light). In short, the energy exists in two dimensions in its oscillation, but the entire "carrier plane for the oscillation" is moving.

In a mass, the mass-energy is three dimensional, not two dimensional, and it is not confined to a plane wavefront. Hence standard "two-dimensional wave in space" pumping will not reverse the mass. It will simply produce nonlinear wave effects, such as phase conjugating incoming "signal" wave or some of the "signal" waves present in the mass.

So the problem in returning the mass-energy includes several requirements:

1. the 3-dimensional energy (highly compressed) that is the mass-energy is what must constitute the "signal wave"
2. the pumping must pump every single point in the mass, throughout its interior, simultaneously, else we are not pumping 3-dimensional energy but are pumping "surface" wise or 2-dimensionally
3. the domain in which we pump ("squeeze") must therefore be what is called "multiply connected" to every point in that 3-space object (mass), and so
4. that is a characteristic of time (the time domain, since at a single point in time, every spatial point in the universe exists), and
5. it must be a localized time-domain pumping, so that only the mass or its close vicinity is pumped. Only by fulfilling all those requirements can we "pump the mass - such as the human body or the body of a test animal - in the time domain, thereby time-reversing the cells back to a previous earlier (healthy) condition.

In France, Pautrizel did some experiments with immature baby rats that clearly proved that time-reversal was involved. He infested the rats (whose immune system was still very immature and not very strong) with trypanosomes.

Then he applied the Priore treatment, which restored the cells back to their previous condition and the immune system back to its previous system. However, the time reversal does not kill the trypanosomes, so the pathogens are still present. And the baby rats' immune systems were still very immature and unable to cope with the pathogens. Hence those rats all died.

Yet mature rats with fully developed immune systems, infected the same way and treated the same way, resulted in the re-invigorated and strong immune systems dispatching the pathogens in short order, so that the rats all lived. In short, he really did show that the EM non-ionizing radiation was in some manner time-reversing the cells of the treated body back over the paths they had taken in time.

Hence he demonstrated that, somehow, those five conditions were being achieved by the odd EM irradiation that Priore had established from stimulated plasmas in plasma tubes.

Becker showed that the cellular regeneration system also restores the cells, and is stimulated and amplified electromagnetically. But he could not achieve quite such startling results, since he used ordinary EM radiation and not specialized EM radiation coming from plasmas.

That was the arena into which I stepped. The first problem was how to "pump in the time domain".

In quantum field theory, there are several polarizations of the photon:

1. the regular transverse photon, which we model as the energy oscillating sideways - and this produces and constitutes the ordinary EM transverse wave. That is the "energy oscillating in the plane of the wavefront, while the wavefront travels at light speed"
2. the longitudinal photon, in which the energy vibrates along the line of motion of the photon, like an accordion contracting and expanding along that direction of travel as it travels
3. the time-polarized or "scalar" photon, in which the oscillation is "outside" 3-space and is oscillating in the time-dimension (time-domain)

Thus one has to discover how to make time-polarized EM waves, which do not appear in any straightforward fashion in Western literature.

I eventually worked out a proposed mechanism for that (the mechanism remains to be experimentally proven, but I am even surer of it now than when I first discovered it some years ago). At any rate, at least in theory I finally had my required time-polarized EM wave, so that one could "pump" or "squeeze" the mass in the time-domain, and hence do what is required for mass-reversal back through its path through time.

This is NOT "time-travel" in the conventional science fiction sense. In time-travel, the entire universe except the observer would have to be time-reversed back to a previous condition, while the observer continued to age normally (move in his forward time).

This does not do that at all. What it does do, is take one piece of the universe and change it back to a previous state.

While it is uncomfortable for scientists to think in such terms, nonetheless dedifferentiation of cells - e.g., as rigorously shown by Becker and others - clearly shows that cells can be "retrogressed" or whatever name one chooses to call "time-reversal". So it is a fact, experimentally demonstrated.

Becker's work, e.g., is applied to cure otherwise intractable bone fractures. Trickle currents or pulsed EM is applied between silver electrodes, one on each side of the fracture.

So (1) a potential exists in the area, and (2) a field also exists.

Eventually, new cells of the type that make bone are deposited in the fracture and it is healed.

Becker revealed the startling thing that happens. The RED BLOOD CELLS entering the area undergo remarkable changes. First, they shuck their hemoglobin and grow nuclei - which is dedifferentiation back to a previous state, before they differentiated into red blood cells. Then the redifferentiate (move forward in time) but to the type of cells that make cartilage! However, that is not what is required, so these cells AGAIN redifferentiate (move forward in time) to the type of cells that make bone.

These are then deposited in the fracture site, closing the site and healing the fracture.

We worked out the underlying type of unified field effects that would be required for those types of changes. We also worked out a proposed manner in which time-domain pump waves were produced in that fracture site. Interestingly, so long as there was a "difference" between the type of cell being pumped (in this case, the red blood cells in the area), the pumping continued and was therefore continually acting to ELIMINATE THAT DELTA.

Hence the changes in the pumped active cells were continually being redirected toward bone cells.

By studying Becker's work and his proposed EM composition of the cellular regeneration system, it became clear that the above mechanism, expanded, was being used by the cellular regeneration system to restore cells. This gave an entirely new function to the potentials in the cells and in their parts.

I already knew (from Whittaker's 1903 paper) that the scalar potential is actually comprised of sets of longitudinal EM phase conjugate wave-pairs.

From this, it became obvious (if my proposed creating mechanism for producing time-polarized EM waves was correct) that the cellular regeneration system was capable of weakly producing time-polarized EM waves, and hence was capable of "pumping" the cells in the time-domain. And therefore capable of time-reversing the mass-energy of the entire pumped cell.

That's about as simple as I can lay it out.

Hope this helps and perhaps answers the question.